FOOD MANUFACTURE

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Anglo-Danish Trade Relations

RETURNED from London, the leader of the Danish Trade and Finance Delegation, Minister Waerum, has informed the Danish Foreign Minister, Mr. Gustav Rasmussen, of the British point of view on Anglo-Danish trade and payments balance. The Danish sterling debt in Britain, at present amounting to about Danish kroner 450 million, is the centre of these negotiations.

The delegation got the impression that Britain will no longer continue to finance Denmark's purchases. On the other hand, Britain does not want Denmark to reduce her purchases in Britain, but to increase her exports. The delegation states that Britain is willing to buy several commodities, especially foodstuffs, from Denmark.

A few figures will show how Anglo-Danish trade has developed up to date. During the first seven months of this year Denmark exported goods to the tune of 740·4 million kroner, while she imported for 1,276·7 million kroner. About half of this exchange of goods took place between Britain and Denmark, Denmark exporting 300·7 million kroners' worth of goods to Britain, while she imported for 575·1 million kroner. To this deficit may be added, among other things, the sterling amount which Britain places at Denmark's disposal for purchases in Argentina, Brazil, and the United States, especially of foodstuffs and other raw materials.

Danish exports to Britain during the first seven months of 1946 were divided as follows: butter, 106·3 million kroner; bacon, 86 million; eggs, 10·6 million; and cheese, 2·5 million kroner.

Britain, on the other hand, exported fuel (including oil) to Denmark to an amount of 56·7 million kroner, iron and steel for 62 million, piece goods for 80·9 million, textiles for 50 million, spinning material for 51·9 million, chemicals for 31·4 million, and means of transportation for 25·2 million kroner.

Considering this exchange of goods, it is evident that a change in the balance of payments can only be obtained either through an increased Danish export or a decreased import from Britain. As Denmark is badly wanting life essential materials, such as iron and steel, fuel, textiles, etc., there is only the former possibility to be considered.

As conditions are at present as regards foodstuffs and other imported agricultural raw materials, an increased export of butter and bacon can only be achieved through certain restrictions in Denmark's daily consumption. In this connexion it may be taken for granted that part of the Danish butter ration will be replaced by margarine to release a greater quantity for export.

On the other hand, Denmark has a surplus production of cheese, but so far the British have not been very interested in buying Danish cheese, and here lies a good possibility of increasing the export. The same applies to beef. Up to now no beef has been exported to Britain, but the situation is changing, and it is likely that Denmark in future will find a ready export market in Britain. In addition to cheese and beef, many other articles may be taken into consideration.

The Danish Foreign Ministry will shortly inform the Government of the discussions made by the delegation in London, and it is expected that the Government will then contact the parties to prepare the basis on which negotiations with Britain are to be resumed.

Relaxing Price Control

Following the removal of price control from a number of fresh vegetables, the Ministry of Food has taken a similar step in regard to fish pastes, and food manufacturers and traders are asking what further relaxations the Ministry contemplates in the near future.

An official of the Ministry said that he would not be surprised if some change were made in the

near future in the marketing of meat, but that did not necessarily imply that price control would be removed. In fact he emphasised that neither wholesale nor retail butchers were eager to revert to pre-war methods. He added that price control would probably be retained on all foods in respect of which an Exchequer subsidy was paid, and that it would probably be continued for some years in the case of essential foods. The Ministry hoped ultimately to remove all restrictions on prices, but the trend must be governed by the law of supply and demand.

Price control is not likely to be lifted from any commodity until adequate supplies are available. In the case of fresh vegetables, the removal of the restrictions has not been attended by any marked changes in prices, and the arrangements made by the Ministry to import supplies when home production falls short of public needs are designed to maintain prices at a steady level; but the Ministry is ready to reimpose price control immediately if the situation should warrant that course.

In the case of fish pastes, the removal of price regulations comes when fish supplies are good and when the future outlook is equally satisfactory. Here again the Ministry is not relying solely on British supplies. Arrangements have been made for the importation of sufficient quantities of fish to warrant the belief that traders will not abuse their new "freedom." Quality control of fish pastes still remains.

The Ministry of Food is watching a number of other manufactured food products and will remove restrictions when there is reason to expect that such a course can be safely taken in the consumers' interests.

Fish By-Products

The future of the fish by-products industry was discussed by Mr. Robert Boothby, M.P. for Aberdeen, when he spoke at the annual dinner in Aberdeen of the Association of Fish Meal Manufacturers of Great Britain. Fixed prices for herring for each purpose at the start of the season, maximum production, and a continued shortage of fish, fertilisers, and feeding stuffs were the prospects in view, but he urged that research and practical application of research could effect the changes desired.

"We shall never go back to the free market. In future prices will be fixed by agreement at the beginning of each season," he declared.

He then went on to say that if the fishermen are guaranteed a fair price for all the herring that can be marketed for freshing, kippering, curing, and canning, there is no reason why they should not accept a somewhat lower price for a surplus that may be available for the manufacture of by-products.

He indicated that they were confronted with a serious shortage of fats, fertilisers, and feeding stuffs, and unfortunately there was no reason to suppose that the shortages would not continue for a long time.

The elaboration of by-products would not solve all the problems of the herring fishing industry. That would depend as in the past on the production of fresh, cured, tinned, and kippered herring.

Whatever the merits of any particular process, it was highly desirable that some suitable outlet should be found for surplus herring during the periods of glut.

A waste of any kind could not be afforded in a time of acute world shortage. It was just as wasteful to leave good fish in the sea as it was to dump them back into it.

Mr. Boothby ended his address saying that white fish meal was already an invaluable and indispensable asset to food production in the country owing to its high protein content, and he was sure it could be made of even greater value in the future.

Corn Law Centenary

In the Press and in meetings of learned societies the centenary of the repeal of the Corn Laws, that step which in 1846 plunged Britain into industrialism, has been fully celebrated. Though in two instances, in centenary addresses by the Hon. George Peel before the Royal Society of Arts and by Sir Andrew McFadyean at the Reform Club, Manchester, wider issues of Free Trade than in food were discussed, Corn Laws as enactments restricting trade in grain are very much our concern. The contrast in the food situation of Britain before and after 1846, and any comparisons which are made with today's position, are of particular interest. For our ruined harvests, our restrictions, and hardly noticeable bread rationing become minimised in effects when compared with conditions in those early decades of the nineteenth century. It was a hard time for landowners and farmers when

poor harvests on top of post-war disturbances in finance and trade brought us almost to famine in 1812. The better harvests in two succeeding years caused farmers to fear ruin through cheap corn; hence the Corn Law of 1815, a year when peace declared found us in an exhausted condition and one followed by further bad harvests bringing distress. 1845 saw hopeless conditions for the poor, with potato disease finally swaying the issue and bringing the Repeal of 1846, with a fall in the price of bread. Despite Lord Melbourne's assertion that "to leave the whole agricultural interests without protection is the wildest and maddest scheme that has ever entered into the imagination of man to conceive," the Anti-Corn Law League concentrated the forces of the Free Trade Party, particularly in Manchester.

The repeal did not cause any striking fall in corn prices nor ruin agriculture, since industrial expansion and prosperity brought increased demands for food. After this we became, as Sir Andrew McFadyean remarks, a Free Trade country and remained so until the great depression, after which some "regime of systematic protection" came. History repeats itself: that seems to be the fear of these members of the Free Trade Union. "We are substantially back in 1846 and the fight must be taken up again," is the cry in a period when subsidies and quotas have replaced corn duties, when subsidies "have the same effects on the economic currents of our life." Subsidies, it is argued, bring the burden of taxation borne by the vast body of the population. The policy enforced by war must not encourage production in this country of crops "which could be obtained from abroad in exchange for industrial goods produced with far fewer man-hours." So runs the clarion call of the Free Trader in commemorating that event of a century ago which banished misery and starvation in Britain and took us along the industrial road.

Vitamin B_1 Retention in Biscuits

The effects of variation of ingredients on vitamin B_1 retention, *p*H, and quality of biscuits are the subject of a study by Alice M. Briant and Marcia R. Hutchins (*Cereal Chemistry*, XXIII, 5, 520).

Biscuits made with fresh milk, evaporated milk, water, and dry whole milk plus water were alike in their vitamin B_1 content. The biscuits made with fresh whole milk retained slightly more of their vitamin B_1 than did the others. In eating quality the biscuits made with fresh milk were judged superior; there was no difference between the quality of the others.

Biscuits made with sodium aluminium sulphate-phosphate baking powder (three brands) were alike in their vitamin B_1 content and retention. Increasing the amount of the baking powder by 50 per cent. (one brand) increased the loss of vitamin B_1 during baking. The biscuits made with a tartrate and with a phosphate baking powder lost more vitamin B_1 than those made with sodium aluminium sulphate-phosphate baking powders. All the biscuits were of similar eating quality.

Biscuits made with varying proportions of lactic acid, bicarbonate of soda, and baking powder retained less vitamin B_1 as the soda was increased. At the lowest level of soda 84 per cent., and at the highest level of soda only 15 per cent., of the vitamin B_1 was retained in the biscuits. The palatability of the biscuits decreased with each increment of soda, but none was inedible.

Voluntary Contributors

Although the full new scheme of social insurance is not yet operative, a modified scheme for pensions came into being from September 30, 1946.

A point of the greatest importance to voluntary contributors, meaning employers and self-employed persons, both "ordinary" (that is those who have qualified for voluntary insurance after a spell as employed contributors) or "special" (those entering by the direct route without such spell) is to see that they keep in insurance with proper qualifications, as otherwise they may find only reduced rate pensions when required and be subject to more difficult conditions than if previously insured. For full rate pensions there must be a "contribution average" of 50 at the pension date, this being obtained by taking the full number of contributions registered throughout insurance and dividing by the number of contribution years since entry into insurance. Thus, taking the full rate pension as 10s., a 50 average is required for this; averages of 45, 40, 35, 30, and 26, mean reduced pensions, 9s., 8s., 7s., 6s., and 5s. respectively. But 26 contributions a year at least must be registered or right to continue in voluntary insurance is lost, although insurance is

not terminated forthwith. If there is an "under 26" total for the contribution year which ended July 7, 1946, insurance would not end before July 6, 1947, and if before that date a total of 26 is completed and a total of at least 26 is registered in the currently running contribution year (July 8, 1946, to July 6, 1947) insurance continues as previously, but bare totals of 26 would bring down the average so that the pension rate would be adversely affected at due date.

If an "under 50" total is registered in the contribution year which ended July 7, 1946, it is permissible until January 5, 1947, to bring up any such total to 50 (or 52) or to any number considered sufficient by the insured person in question, the arrears contributions to be at the rates ruling before July 7, 1946, not the increased rates which have applied since September 30, 1946.

Under the new modified scheme, the pension rates given above apply whether work is continued or not and irrespective of amount of earnings, but if retirement takes place the increased rates will apply, reduced rates still applying if there is a contribution average under 50. The full rate for average of 50 is 26s.; for "under 50" averages the rates are 23s., 20s., 18s., 15s., and 13s. instead of the rates given above.

Points of importance in remaining insured are that the first batch of special voluntary contributors qualify for Old Age Pensions in 1948 (50 average required for full pension); present ordinary voluntary contributors only require five years' insurance to qualify, entrants after September 30, 1946, ten years, and the fact that when the full scheme operates almost everyone will be brought into insurance whether present insurance is kept up or not. As from September 30, 1946, new rules make wives of special voluntary contributors eligible at 60 for pensions (the original scheme was 65) the same as for the ordinary voluntary contributors—that is, when the man qualifies.

Dining Out

The gentle art of dining out has sadly deteriorated since those palmy days when it was possible to partake of meals when anything over the "five bob" maximum was not charged as flowers, orchestra, cover charges, and huge increments on the normal charges for liquid refreshment. Restaurant feeding provides ample scope for the Englishman's proverbial addiction to grumbling and although meals there may be that shed lustre on the chef's art, they are scarce, in common with the sparseness of the "helpings."

Seated "in full fig," as Charles Lamb would say, in the dining-room of a grand hotel lacking nothing in display, the diner-out finds that his gastronomic anticipations are not realised by the nature of the "main dishes." It is doubtful whether the most imaginative of diners ever visualises the scene in the kitchen, where that ambassadorial and highly-paid personage—the *chef de cuisine*—holds sway. Such a scene might reveal the autocrat fulminating with Gallic gestures at the sight of the stocks of egg powder, margarine, and substitutes with which he is expected to prepare the day's menu.

"*Mon Dieu!*" he is saying, "shade of Escoffier! Am I expected to perform miracles of the *haute cuisine* with this rubbish? Would a Rembrandt be expected to paint a masterpiece with a sixpenny box of child's crayons? Bah! To try and make a *crêpes Verlaine* from *that* powder. I give it up." With the arrival of the waiter, the imaginative diner comes to earth and sees an omelette of indescribable insipidity on the plate before him.

The chef's attitude is a human one although in this synthetic age bricks are often made without straw. There are those who will blame him and others exonerate. Doubtless there are many exceptions to the rule of the despairing chef as we gather from those ubiquitous enthusiasts who can always tell you of "a nice little place" they have discovered.

The less adventurous of us, when the tenuous weekly joint has come to an end, will probably content ourselves at home with the maligned but tasty sausage or herring (obtained on its last journey by someone's physical labour in a queue) washed down by a mouthful or so of styptic Algerian wine, at intervals succumbing to the curious temptation of that self-torture, which assails the most sybaritic, by reading our well-worn volume of Brillat-Savarin or some treasured back numbers of that gastronomical quarterly *Wine and Food* and hoping that some day the piping times of peace will return and the chef's problems be solved.

TO AUTHORS

FOOD MANUFACTURE is prepared to consider the publication of any books on scientific and technical subjects which authors might care to submit.

Rice

Its Processing and Enrichment

SPECIALLY CONTRIBUTED

At work in the rice fields at Kashmir, near the foot of the Himalayas.

Feeding the densely populated countries of the East, many of which depend largely on rice as their staple article of diet, is if anything an even more difficult matter than saving large parts of Europe from starvation. In view of the tremendous reduction in rice cultivation through Japanese occupation of the principal producing countries it is clear that every effort must be exerted to make what supplies are available go as far as possible, and to this end increase the food value of rice as near to its optimum as practicable. But since the people of the Orient persist in their obstinate preference for the white polished rice, a miserably emaciated and devitaminised product bringing the scourge of beri-beri in its train, what is to be done about it ?

THE East, in common with other parts of the world, has suffered a serious decline in available foodstuffs such as wheat, meat, fats, etc.; but here the position has been worsened by the very serious fall in the production of rice in countries occupied by Japan. In the two principal rice-exporting countries, Burma and Siam, production in 1946 is estimated at only 4·9 million tons as compared with a pre-war average of 8·4 million tons. There has also been a drastic decline in the Far Eastern production of vegetable oils and sugar. The reduction of output through the ravages of war has been intensified by the equally, if not still more severe, ravages of drought in many parts of the world, including India.

In the White Paper presented to Parliament on the world food shortage by the Minister of Food (Cmd. 6785) it is stated that when the rice-producing countries were invaded by the Japanese steps were at once taken to encourage increased production from alternative sources — Egypt, Brazil, West Africa, and Madagascar — and measures taken to secure supplies on behalf of the Ministry of Food. Plans were also prepared to meet the situation when the rice countries were liberated, including the shipment of consumer goods and farm implements to Siam, to which country a Rice Unit was despatched in September, 1945. In French Indo-China close *liaison* is maintained with the French authorities, but owing to conditions of famine there any surplus for export is most unlikely. Nothing is said about increased cultivation of rice in the southern United States, especially California, but here again any considerable surplus for export is not to be expected.

On the other hand, a certain amount of interesting work has been done in recent years by

Rice seeds being planted in the Kenya swamps.

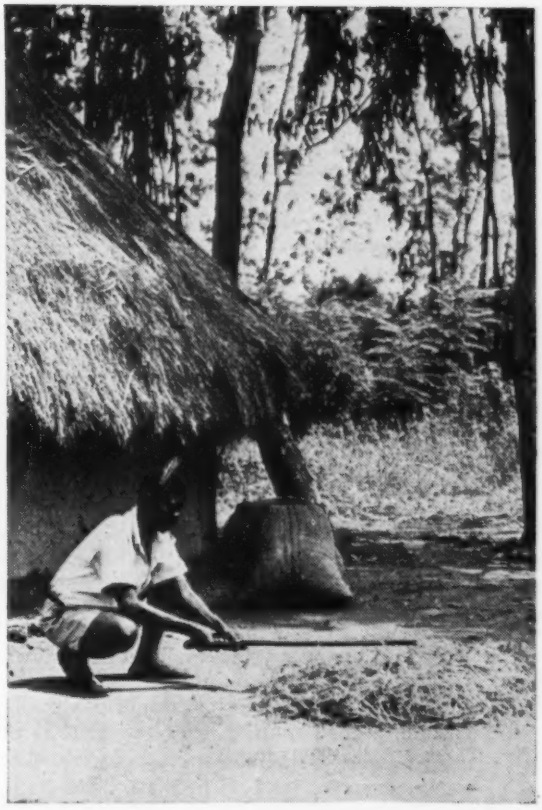
Seedlings being lifted for transplantation.

American cereal and agricultural chemists in an endeavour to improve the food value of rice, including methods of processing to conserve the vitamins or of enrichment by incorporating a concentrate or premix with the white rice. This work is an important contribution to the rice problem, more particularly of course in the East, but also in countries like our own, which, in normal times, import large quantities of rice. Although the manner in which the rice was cooked in this country before the war — with plenty of milk, sugar, eggs—goes far to mask its comparatively low food value, it is clear that under present conditions and for some time to come every attempt should be made to increase the food value of such supplies as are available.

The young seedlings are separated and planted in the paddy field.

On page 63 of the Food Ministry's Manual of Nutrition (1945) the nutrient values of rice and other

The crop is harvested by hand.



The farmer threshes his rice in the time-honoured way.

cereals are given, but it is not stated which of the dozen or more different kinds of processed rice are referred to. The values per ounce of edible portion are as follows: Waste 0, Cal. 99, protein 1·8 g., fat 0·3 g., carbohydrate 22·2 g., calcium 1 mg., iron 0·1 mg., vitamins A, C, D absent, vitamin B_1 0·02 mg., riboflavin 0·02 mg., nicotinic acid (niacin) 0·3 mg.

As is well known, all members of the vitamin B group are soluble in water. These can now be fairly readily synthesised, and their synthesis forms the subject of many patents. For example, a recent American patent (No. 2400710, assigned to Lederle Labs., Inc., of New York) claims a method for producing riboflavin from the fungus *Eremothecium ashbii* in a liquid medium comprising water, animal protein, carbohydrate, and a malt extract, under aerobic conditions.

The following is a brief review of recent litera-

The crops are weighed ready to be taken to the mill.

ture on rice and its vitamin content. In a paper on the deficiencies of polished rice in relation to beri-beri (*Am. Jnl. Trop. Med.*, 1943, **23**, 43-7), E. B. Vedder found that, in feeding rats on a deficient diet, the long staple type of Carolina polished rice failed to supply the following components of the B_2 complex: pyridoxin, riboflavin, pantothenic acid, and choline; and concludes that clinical beri-beri is caused by a complicated vitamin deficiency including at least all the above-named factors.

Vitamin B Complex

Virginia R. Williams and co-workers made a study of some of the vitamin B complex factors in rice and its milled products (*Cereal Chem.*, 1943, **20**, 560-3). No significant differences in vitamin content due to difference of locality were shown, although some slight differences were apparent. The long grain rices such as Niro and Fortuna were highest in vitamin content; Rexora and Blue Rose occupied an intermediate position; and the short-grained varieties, Early Prolific and American Pearl, were lowest. Rice polishings and bran are excellent sources of thiamin (B_1), nicotinic acid, pantothenic acid, and pyridoxin; also the brown rice, though lower in vitamin content than the polishings and bran, as one would naturally expect, is still a good source. (See also Part II in *Cer. Chem.*, 1944, **21**, 540-3.)

American Investigations

Some interesting papers by M. C. Kik and co-workers, of the Agricultural Chemistry Department of Arkansas University, were published in 1943-4:

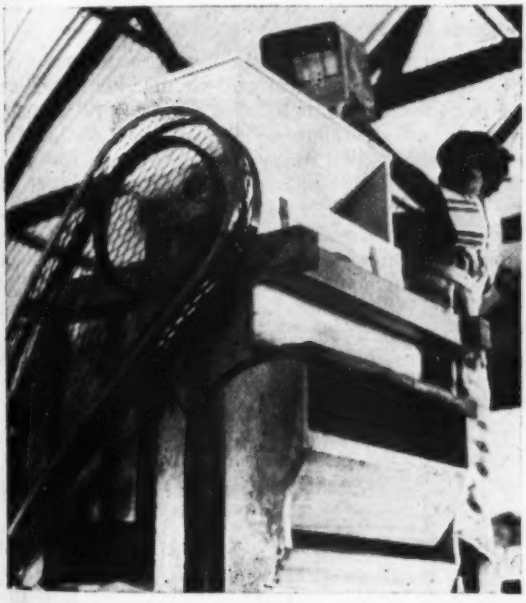
(1) Riboflavin products of commercial rice-milling, and thiamin and riboflavin in rice varieties (*Cer. Chem.*, 1943, **20**, 563-9). In this study a loss of 50 per cent. riboflavin was due to the milling process. Both the thiamin and riboflavin content of the raw rices differed with variety and locality. (2) Effect of processing on the thiamin, riboflavin, and niacin content of rice (*loc. cit.*, 569-72). Sixty-g. samples of rough rice were cleaned with cold distilled water, and the wet grains were successively exposed to vacuum, hot water under pressure, and steam. They were finally dried and milled. To ensure the same degree of milling, treated and untreated samples were milled for the same length of time. The milled samples were ground and suitable amounts were weighed for vitamin analysis. This method is said to be similar to an English patented process, H. R. Rice Conversion 1940. (*Cf.* also Eng. Pat. No. 552510 of F. Hoffmann-La Roche Akt. Ges., Basle, of which the Convention date based on the Swiss equivalent is 1940.*) Data are presented which show that this method has a favourable influence on the thiamin, riboflavin, and niacin content of the milled rice. With the old method the retention of thiamin amounted to only 22·2 per cent., but with the new it was 63·5 per cent. (3) Nicotinic acid in products of commercial rice milling and in rice varieties (*loc. cit.*, 1944, **21**, 154-8). The average content for paddy or rough rice and for whole brown rice is 49·2 μg/g. and 55·1 μg/g. respectively. Of the finished cleaned products, the end product (first head rice sold for human consumption) contained an average of 18·4 μg/g. and the second head 17·7 μg/g. of dry matter. An average of 66·4 per cent. nicotinic acid was removed during milling. Screenings and brewers' rice contained 23·8 and 36·1 μg/g. respectively. Of the by-products, the hulls contained 18·6 μg/g., the bran 262·8-358 μg/g., and the rice polishings 206·6-408·0 μg/g. of nicotinic acid. The content varies with variety and to a small extent with locality. The maximum amount of nicotinic acid is probably to be found in dried brewers' yeast (21·8 mg. per ounce) and next in meat extract (17·0 mg/oz.), according to the Food Ministry's Manual of Nutrition, already quoted. The content in rice (precise kind of rice not stated) is 0·3 mg/oz. The manual adds, rather unkindly, that tobacco smoking does not add to the body's supply of nicotinic acid, though it is chemically similar to part of the substance nicotine, and it is not derived from nicotine in nature. The disease pellagra is liable to result from extreme deficiency of this acid in the diet.

Russian Work

Turning to some Russian work on the biological chemistry of rice, reference may be made to a paper by T. E. Pavlovskaya (*Dokl. Akad Nauk*, S.S.S.R., 1943, **41**, 255-7) on the extraction of B_1 from rice and by-products. The experimental extraction method consisted in treating 200 g. of sample with 300 c.c. of solvent (8 per cent. or 70 per cent. alcohol), filtering, washing residue with solvent, evaporating the alcohol, and applying a basic lead acetate treatment to the aqueous solution, which was finally evaporated to 50 to 100 ml. before determining the amount of B_1. The 8 per cent. alcohol was much more effective than the 70 per cent. in extracting the vitamin from rice germs; and grinding the rice germs was also favourable.

* In this patent specification claim is made for vitaminised rice and process, stating that synthetic water-soluble vitamins can be added to rice from which the germ and husk have been removed by polishing. This is achieved by polishing the dehusked rice with a glucose dextrin solution containing the synthetic water-soluble vitamin. See also paper by M. F. Furter and co-workers noted below.

An inspector comparing polished and graded rice with partially cleaned rice purchased from African farmers.



Feeding rice into the polishing and grading machine.

The cleaned, polished, and graded rice is bagged.

Six successive extractions with 8 per cent. alcohol were needed for complete extraction from rice germs. The products tested were germs, husks, and bran, the first being by far the most important in a ratio of about 140:1—namely, 70,240γ from one kilogram in the case of germ, as compared with 500 and 430γ respectively for husks and bran.

Rice Growing in California

Rice growing has long held a high place in Californian agriculture, and has become one of the leading cereals of that state. The Rice Growers' Association of California is an active and progressive body, and in recent years has sponsored a considerable amount of research in connexion with rice processing. By way of example, a brief summary of a paper by Relda Cailleau and co-workers at the University of California on the thiamin content of raw and parboiled rices is presented (*Cer. Chem.*, 1945, **22,** 50-59).

The relative vitamin content of raw and parboiled rice has been the subject of considerable study in recent years in most rice-eating countries. Much of the work reported prior to 1940 was reviewed in a comprehensive memoir by Akroyd and co-workers on "The Rice Problem in India" (*Indian Med. Research Mem.*, 1940, **32,** 1-84). The subject has become of special interest at the present time in view of the new processes now used in rice milling, including the various operations of parboiling, malekising, etc. The present study relates mainly to Californian-grown Caloro rice, the thiamin content of which was determined by the rat growth method, and also chemically ascertained by the thiochrome method of Conner and Straub (*Ind. Eng. Chem.*, An. Edit., 1941, **13,** 380-4). Samples fed were: (A) Raw or uncooked group, comprising (1) brown or husked rice of which the outer hull alone had been removed; owing to the short, thick shape of this variety, the germ and bran layers are not so easily lost in hulling as with the long-grain varieties. (2) Parboiled brown, or the same brown rice of the first category subjected to preliminary soaking and steaming in the paddy form, then husked and dried. (3) Parboiled and under-milled—*i.e.* the parboiled dried rice was lightly milled so as to remove most of the outer bran but retain the germ and one or more of the inner bran layers. (4) Completely milled white or polished rice with neither bran nor germ. In addition, samples of paddy or rough rice were obtainable from other states, such as Texas, etc., including Caloro, Blue Rose, Early Prolific, Colusa, and Rexoro rices which were under-milled, the husk only being removed, and were examined by the thiocrome method as soon as received. (B) The preceding samples cooked in just enough water to be wholly absorbed. (C) Canned rice; all of these were parboiled. The effects of the different treatments or origin may thus be summarised:

1. *Milling and Parboiling.*—The raw brown rice with only the husk removed contained more thiamin than any milled samples—namely, 3·8 μg/g.; parboiled brown and under-milled rices were next, with a thiamin content of 2·2-3 μg/g.; while polished rice contained the least, 0·9.
2. *Cooking.*—Using the minimum amount of water, with no liquid discarded, produced no loss of thiamin in the parboiled rices, but may have caused some loss in the raw brown rice.
3. *Canning.*—In the case of parboiled brown or under-milled, with economy of water in the preliminary cooking there was about 15 per cent. loss of thiamin; but with large amounts of water in the preliminary cooking the loss was 50 per cent. or more.
4. *Variety and Origin.*—No significant differences were found in thiamin content due to variety or place of origin.
5. *Storage.*—After 6 months' storage at 20° C. under good conditions the loss of thiamin in brown rice was found to vary from 0-30 per cent. Rice bran and rice polishings lost 16-28 per cent. after 6 months, and 50-67 per cent. after 24 months. Canned parboiled rice was also found to lose 20-30 per cent. during 3 months' storage; but parboiled brown and under-milled rice samples did not appear to lose thiamin in storage.

Some further information on this matter is to be found in *Abstracts of Studies on Rice*, 1937, Imp. Gov. Inst. for Research in Nutrition, Tokyo, and in a paper by M. Swaminathan on the effect of washing and cooking on the vitamin B_1 content of raw and parboiled milled rice (*Ind. Jnl. Med. Res.*, 1942, **30,** 409-16).

Vitamin Assay

On the important question of vitamin assay or analysis, both biological and chemical, in addition to the thiochrome method of Conner and Straub, already noted, reference should be made to the annual reports on assay methods, both for riboflavin and niacin, of the American Association of Cereal Chemists (*Cereal Chem.*, 1945, **22,** 448-61, and previous years). A rapid method for the combined determination of thiamin and riboflavin in cereal products generally is briefly described by Hoffer and Alcock (*loc. cit.*, **22,** 271) by extraction with 20 ml. of 25 per cent. KCl in 2 per cent. acetic acid, as used by Purity Flour Mills, Ltd., of Winnipeg. A simplified colorimetric determination of thiamin in cereal products (including white and brown rice) is described by M. Hochberg and co-workers of the Food Research Labs., Inc., Long Island City, N.Y. (*Cer. Chem.*, 1945, **22,** 839).

Rice Enrichment

Several American firms now frequently advertise what they term "vitamin boosters" for food enrichment, such, for example, as the riboflavin

boosters of the Winthrop Chemical Co. of New York and crystalline B_1, etc., by Merck and Co., and others. The Monsanto Chemical Co. state that B_1 is destroyed by excess alkalinity, but by adding their special preparation of calcium phosphate to flour, for example, it is kept in a slightly acid condition, and as much as 50 per cent. of the B_1 otherwise lost in baking is saved.

Flour Enrichment

Progress made with wheat flour enrichment has obviously suggested similar methods with rice, and some interesting work has been done in this direction during the past few years; naturally accentuated by war conditions, and still more necessary today in view of what has been said already on the economics of the world rice position. One of the leading firms in this development is the Hoffmann-La Roche Akt. Ges., of Basle, Switzerland, and its American associates in New York. Their latest results have recently been described by members of their research staff, M. F. Furter and co-workers (*Ind. Eng. Chem.*, May, 1946). A valuable aspect of this work is the fact that, realising the very strong preference for polished white rice both by Eastern and Western peoples, they have prepared a concentrated premix rich in all the factors removed from fully milled white rice plus one or two others, and diluted this with white rice in such manner that, it is claimed, the product has the same appearance and flavour as white rice. The extent of enrichment can, of course, be varied, but it is apparently quite easy to prepare a finished product richer in thiamin and niacin and definitely much richer in iron than unmilled brown rice. They do not at present apparently worry too much about riboflavin, because, owing to its yellow colour, it is apt to spoil the appearance of the enriched white rice. A slight yellowing, however, ought not to be taken too seriously, and should in any case not be difficult to mask if really necessary.

The premix or concentrate is prepared on a rice base which may be completely milled (white rice) or converted, or under-milled; and in order to allow for slight losses in washing and cooking—it is claimed that these are insignificant—and fulfil the requirements of the U.S. Food and Drug Administration in thiamin, etc., content, the concentrate contains the following:

	mg./lb.
Thiamin (plus 25 excess) ..	500
Niacin	3,200
Iron (as pyrophosphate) ..	2,600

No riboflavin is added, and the amount of this present will depend on the kind of rice base used. This, and indeed also the total amount of the other factors, will be more if converted or under-milled rice is used as base instead of polished white rice; and even this latter is not, of course, entirely devoid of a small percentage of essential factors. The concentrate is diluted with white rice to the required degree—up to 200 parts diluent to one of premix—and thoroughly mixed so that the result is completely uniform and homogeneous.

Several varieties of rice, both short-grained and long-grained, were enriched in this way by the Roche process on a pilot plant scale, and the stability both of the premix and of the finished product were thoroughly tested against washing, cooking, and prolonged storage. Taste and appearance are said to be very similar to those of ordinary white polished rice, so that the most conservative and obstinate consumers of this latter, in the East or in the West, should be able to tolerate amounts customary in their usual diet, and possibly even more when they have become better educated or more intelligent in regard to real food values. The resistance of the enriched product to cooking is achieved by means of a water-resistant and protective film (*cf.* Eng. Pat. 552510), which, as a result of numerous tests, is said to be highly effective, especially in view of the comparatively heavy losses of vitamin and iron which result from the washing of ordinary rice. It is perhaps hardly correct to speak of heavy losses, since much of the vitamin, if not also the iron, has already been removed from the rice in the processes of milling and polishing. At all events, washing further reduces the small residue of these essential factors, so much the more readily because, as a result probably of milling operations, they are now concentrated close to the surface and, from their easy solubility in water, are the more speedily removed.

The Stability of the Premix

The stability of the premix and diluted product was also found satisfactory in cooking, if the right methods and especially no excess of water are used; and the same result was given by comparatively rigorous packaging and transport tests and ordinary storage tests in paper, burlap, tin, wood, and glass containers for periods up to twelve months under various climatic conditions, including temperatures up to 40° C. and high humidity.

The authors describe in detail their nutritional and reproductive studies with rats, which showed that considerable amounts of premix can be tolerated and that the thiamin content is readily available for growth. And quantitative measurements with the human bio-assay technique indicated that both the thiamin and niacin in cooked enriched rice are completely available to the human organism.

Ministry of Food

Latest Statutory Rules and Orders

The list given below is the continuation of the list of Orders published in *Food Manufacture*, November 1, 1946, page 482.

PRICE FIXATION ORDERS

No.	Date. 1946.	
1323	Aug. 1.	Canned Fruit (Prohibition of Retail Sales) Order.
1344	,, 7.	Soya Flour (Control and Maximum Prices) Order. Revokes S.R. & O. 1943 No. 855; 1944 No. 3.
1355	,, 8.	Meat Products, Canned Soup, and Canned Meat (Control and Maximum Prices) Order. Revokes S.R. & O. 1944 Nos. 763, 888, 1296; 1945 Nos. 109, 216, 629, 798, 1491, 1942; 1946 No. 728; 1945 No. 196, as respects Meat Products, Canned Soup, and Canned Meat only.
1365	,, 9.	Order amending the Chocolate, Sugar Confectionery, and Cocoa Products (Control and Maximum Prices) Order, 1944. (Farthings, medicated products, maximum prices.)
1366	,, 9.	Order amending the Canned Fish (Maximum Prices) Order, 1946. (Crawfish, kipper snacks, home-canned fish.)
1410	,, 20.	Order amending the Animal Oils and Fats (Control and Maximum Prices) Order, 1943. (Tallows, greases.)
1411	,, 20.	Order amending the Tomatoes Order, 1946. (Autumn prices.)
1412	,, 20.	Directions supplementary to the Milk (Control and Maximum Prices) (Great Britain) Order, 1945. (2 pints ration.) Revokes S.R. & O. 1946 No. 944.
1447	,, 26.	Order amending the Fish (Control and Maximum Prices) Order, 1946. (Cod, saithe.)
1458	,, 28.	Poultry (Control and Maximum Prices) Order. Revokes S.R. & O. 1943 Nos. 1614, 1656 and 1751; 1944 Nos. 973, 1333 and 1197.
1459	,, 28.	Poultry (Control and Maximum Prices) (Northern Ireland) Order. Revokes S.R. & O. 1943 No. 1615; 1944 No. 1308; 1945 No. 1421.
1460	,, 28.	Tea (Prices) Order. Revokes S.R. & O. 1941 No. 859; 1943 No. 51.

FEEDING STUFFS

1416	Aug. 21.	Order amending the Feeding Stuffs (Regulation of Manufacture) Order, 1944.

FLOUR

1536	Sept. 18.	Order amending the Flour Order, 1945 (Extraction rate). Revokes S.R. & O. 1946 Nos. 265, 312, 662.

FRUIT

1325	Aug. 1.	Order amending the Home-Grown Soft Fruit Order, 1946, and the Imported Soft Fruit Order, 1946. (Bilberries, blackberries.)
1466	,, 29.	Imported Apples Order Revokes S.R. & O. 1945 No. 1396; 1946 Nos. 612, 1140.
1553	Sept. 26.	Order amending the Imported Apples Order, 1946. (Delivery dates.)

LABELLING

*1487	Sept. 4.	General Licence. (1944 No. 1447.) (Fresh fruit and vegetables.)

* Printed with S.R. & O. 1946 No. 1486.

POINTS RATIONING

1517	Sept. 12.	Order amending the Food (Points Rationing) Order, 1946. (Flour products; Mincemeat; Packed meals; Jellies.)

POTATOES

1564	Sept. 26.	Potatoes (1946 Crop) (No. 2) Order. Revokes S.R. & O. 1946 Nos. 1259, 1407.

RATIONING

1490	Sept. 5.	Order amending the Feeding Stuffs (Rationing) Order, 1943, and giving Direction thereunder. (Pigs, poultry.)
1518	,, 15.	Order amending the Sugar and Preserves (Rationing) Order, 1946. (Additional sugar; Seamen's rations; Mincemeat.)
1521	,, 13.	Order amending the Fats, Cheese, and Tea (Rationing) (No. 2) Order, 1946. (Tea coupons.)

VEGETABLES

1469	Aug. 30.	Carrots (1946 Crop) (No. 2) Order. Revokes S.R. & O. 1946 No. 809 with the exception of Article 3.

Education in the Food Factory

GEORGE RAUCH

The necessity for education is one of the items of progress recognised by almost every industry in this country. Many of the suggestions put forward are often vague. This practical article sketches out a scheme for the education of the food preserving technician and contains suggestions as to the manner in which the food manufacturer can educate his own technical staff.

THE rapid development of the canning and jam industries, followed by its ever-growing mechanisation, and the introduction of highly organised production control systems, has put many additional demands on the preserving technician. It is notable that the preserving industry does not enjoy the advantages of other technical trades as far as the educational side for its technicians is concerned. The engineering and textile industry, the building trade, etc., have developed facilities to educate and train highly skilled technicians able to satisfy the growing demands of their industries. Practically no such facilities exist for Britain's growing preserving industry.

This is a question whose importance should not be underestimated, as in few industries is the human element more important. Canning, jam boiling, and food preservation generally, is not only a highly skilled trade but also an art with a large scope for imaginative work and individual ability, and it behoves the manufacturer to face the problem of educating his own technical staff.

Practical Experience v. Theoretical Knowledge

So far the main emphasis has been laid on practical experience. This may have been perfectly justified in the past, but it now becomes apparent that food preservation is a job for all-round technicians; experience is only useful if right conclusions are derived from it, and to derive proper conclusions, theoretical knowledge is necessary. This article proposes to give an outline for the education of young preserving technicians to render them capable of dealing, not only with technical, but also with commercial questions, and in due time, of taking a place on the executive staff. The main lines of elementary knowledge required of preserving technicians can be roughly divided in two parts (*a*) commercial knowledge; (*b*) technical knowledge.

Commercial knowledge will embrace Elementary Book-keeping, Correspondence, Elementary Commercial Law, Costings and Wages, and Transport Organisation.

Technical knowledge includes Practical Canning, Practical Jam Boiling, Elements of Mechanics, Heating Economy, Special machines used in the Canning and Jam Production, Elementary Inorganic and Organic Chemistry, Technology of the Raw Material used in the Industry, and Factory Organisation, Production Control and Statistics.

At first sight this seems to be a formidable array of knowledge, but daily experience in the preserving industry proves that nothing short of these items will enable an executive technician to deal with continuously arising questions.

Scheme for a Preserving Factory

It is a difficult problem to fit such an educational scheme into the routine of a preserving factory. Most important is the choice of suitable people. Only technically interested boys with a good elementary school education should be encouraged to take up an apprenticeship. The age between 16 and 17 years is the ideal one. Further, it is important to gain the co-operation of the parents, who should be encouraged to keep in regular touch with the works management. For the actual scheme it is advisable for the boys to pass through the departments according to a preconceived plan. The chart below gives an indication:

COMMERCIAL STUDIES.

Department.	*Length of Time.*	*Supplementary Education.*
Stores	3 months	
General office work	3 ,,	Evening classes in book-keeping, correspondence, and shorthand.
Correspondence ..	2 ,,	
Book-keeping ..	3 ,,	
Dispatch	3 ,,	
	14 ,,	

TECHNICAL STUDIES.

Department.	*Length of Time.*	*Supplementary Education.*
Jam boiling ..	8 months	
Laboratory ..	2 ,,	
Fitters' shop ..	2 ,,	Evening classes in engineering.
Canning	8 ,,	
Canning laboratory	2 ,,	
	22 ,,	

The scheme provides for three years of apprenticeship and is open to modifications. Factories without laboratories, where the necessary chemical and physical tests are part of the works routine, will have to include the laboratory training under the item of "Jam Boiling" or "Canning." Canning factories without a jam department, or jam factories without a canning department, would have to modify the scheme accordingly.

Co-operation a Necessity

It is, of course, much easier to devise a scheme than to run it, and one of this kind can only work with the full co-operation of all concerned. Many experienced practical technicians feel rather reluctant to impart hard-gained knowledge and experience to others. It is therefore necessary to entrust the supervision of the scheme to a person who has not only a genuine interest in youth, and in educational questions, but who will possess the tact necessary to deal with these matters. It is equally important to co-ordinate the scheme throughout the different departments. Many factory departments have a tendency to regard themselves as self-contained units, and this scheme may help to correct this evil. The fact of passing through different departments will result in better appreciation of the importance of, and the amount of work done in, the different sections of the factory. It is, however, obvious that the comparatively narrow factory routine is not sufficient to impart theoretical understanding of the production process. In larger towns where the attendance of evening classes is possible, this deficiency may be made up.

The attendance at classes as indicated on the chart should be obligatory and part of the conditions of apprenticeship. Unfortunately, many places do not offer such facilities, and in such cases the factory management would have to make provisions for the supplementary theoretical education. This could be arranged in several ways.

Every factory, however small, should have a technical library accessible to all employees. Such a library should contain important reference books, the leading trade journals, reports from the research stations, and, if possible, copies of interesting reports from representatives or customers.

In order to ensure that the library is really used, it is advisable to organise at least once a month a meeting where articles or other items of interest can be discussed and views exchanged.

It should be possible, even in small towns, to organise lectures on interesting topics. Such lectures could be held in co-operation with the W.E.A., and occasionally similar lectures could be jointly organised with other local firms.

The young technician should be encouraged to write regular reports, which should contain suggestions or constructive criticism. It is, of course, necessary to give these reports serious consideration. They should be either discussed in the aforementioned meetings or acknowledged in writing, as nothing is more discouraging than the patronising and rather blank attitude so often shown to criticism or suggestions.

Finally, there is the possibility of exchanging young technicians with other factories for training purposes. This may sound a Utopian suggestion, the idea that the mistakes of one factory are of some benefit to its competitors being still far too widespread. This is a fallacy, because it is a fact that nothing has contributed more to the rapid development of the trade than the general improvement of the quality standard of preserves. A new generation of highly skilled preserving technicians will be a safeguard and a guarantee for the further development of the industry.

Mineral Oil in Foods

IN 1943 the Council on Foods and Nutrition of the American Medical Association called attention to the harmful effects of mineral oil in foods by stating that the ingestion of liquid petrolatum was capable of interfering seriously with the absorption of carotene, vitamin D, calcium and phosphorus, and vitamin K. The effects of its prolonged use had not been thoroughly investigated, but there was sufficient evidence of possible harmful effects to justify the conclusion that its indiscriminate use in foods or in cooking was not in the interest of good nutrition, and any such use should be under careful supervision of a physician.

This statement is now repeated (*J. Amer. Med. Ass.*, 1946, **131**, 1426) because the high prices and scarcity of edible oils have apparently resulted in an increasing use of mineral oil in foods, especially in salad dressings, as a result of the ingestion of which faecal incontinence has been noted.

The Concentration of Coffee Extracts by Freezing

R. GANE,
Low Temperature Research Station, Cambridge.

This article describes experiments on the preparation of extracts of coffee and their concentration by freezing and centrifuging.

THE method of concentrating fruit juices by freezing out some of the water and removing it as ice has been described by Krause[1] and discussed by Morris[2] and Bilham.[3]

When an aqueous solution containing one solute is cooled to temperatures below 0° C., one of the following changes may occur:

(i) crystallisation and deposition of the soluble substance when the solution becomes super-saturated;
(ii) solidification, where ice and solute separate together as from a eutectic solution;
(iii) separation of pure ice with resultant concentration of solutes in the liquid phase.

Only when the third change takes place virtually in isolation is it possible to obtain a concentration of the soluble substances. In solutions containing a number of different solutes, it is possible for one or more of the constituents to be deposited from the solution while others are concentrated.

The advantages of concentration by freezing are briefly that

1, at the low temperature used (−10° to −20° C.) perishable products can be held for long periods without deterioration;
2, there is no risk of spoilage, as in concentration by heating;
3, the loss of volatile components is considerably reduced, if not entirely eliminated;
4, the energy required to freeze water is small, as compared with that required to evaporate water.

In practice, the rate and extent of ice formation must be controlled to ensure that the ice crystals are pure and do not contain inclusions of fluid; also, to obtain a separation of ice from the liquid phase, it is essential that the latter should be fluid, and not a gel, at the temperature of freezing. The separation may be made either by simple drainage at the low temperature or, by mechanical means, in a press or a centrifuge at ordinary temperatures. It is an advantage to have slight thawing of the ice during separation, as this ensures a more complete recovery of the liquid phase without much attendant dilution.

Optimum working conditions are those in which approximately half the water is removed as ice in one freezing operation. If further concentration is required the remainder is refrozen at a lower temperature and re-centrifuged.

An aqueous extract of coffee is typical of a certain class of liquid which might with advantage be concentrated by the freezing method, and the results of the ensuing experiments may be of some

RELATION BETWEEN FREEZING POINT AND CONCENTRATION OF COFFEE EXTRACTS.

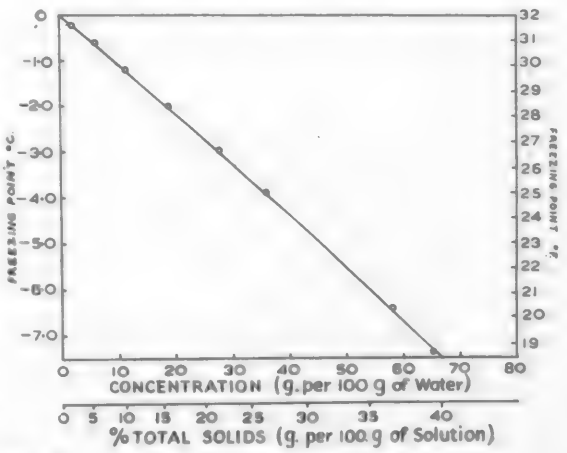


Fig. 1.

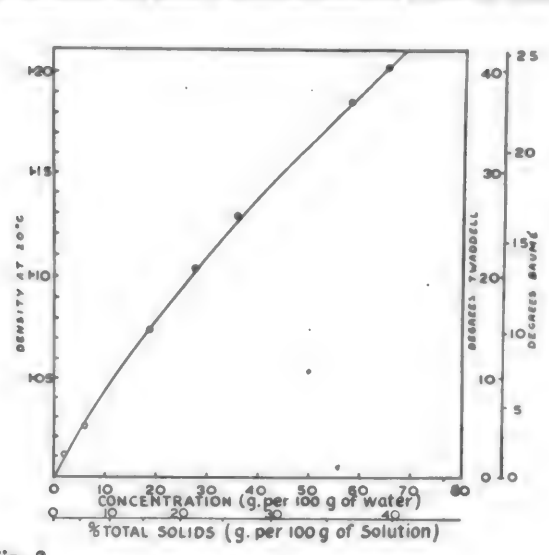

RELATION BETWEEN DENSITY AND CONCENTRATION OF COFFEE EXTRACTS.
DENSITY AT 20°C
DEGREES TWADDELL
DEGREES BAUMÉ
CONCENTRATION (g. per 100 g of water)
% TOTAL SOLIDS (g. per 100 g of Solution)

Fig. 2.

general interest in connexion with problems of food processing. The results differ greatly from those reported for cane sugar and orange juice by Morris, and it would seem that coffee solutions behave as if the molecular weight of the solute were 172 instead of 342 as for sucrose; hence, at a given temperature, coffee solutions are only half as concentrated as solutions of sucrose.

Work of a preliminary nature was necessary on the methods of preparation and estimation of coffee extracts and to determine the total soluble material and certain physical properties such as density, refractive index, and freezing point. The quality of the extracts was not examined critically by trained tasters but, to non-expert palates, appeared to be excellent.

Concentration and Freezing Point

The total solids in various coffee extracts were determined, after filtering, by evaporating a known volume to dryness, first on a water bath and then in an air oven at 100° C. for 120 hours, by which time the weight had become practically constant. The freezing points were first determined approximately and then more accurately by super-cooling about 7 ml. of liquid, in a jacketed tube immersed in a brine bath, to a temperature about 0·5° C. lower. With such a small degree of super-cooling it was necessary to seed with a crystal of ice introduced on the end of a stirrer. After seeding, the temperature rose rapidly to the freezing point and remained steady for periods of 2 to 3 min. without change, even when the brine bath was 3° to 4° C. lower than the freezing point. This method was preferred on the grounds both of accuracy and simplicity, to the alternative method of analysing concentrates drained from partially frozen mixtures held at different temperatures.

From the results given in graphical form in Fig. 1, the mean molecular weight of the solutes was calculated and found to be about 172.

From the appearance of solutions cooled to temperatures only slightly lower than those given in Fig. 1, *i.e.* about −10° C., it seemed that concentration had proceeded to a stage where a eutectic solution had formed and that this had frozen to a solid mass. This was not examined in any detail, but, in the case of some cooling experiments, it was noted that the viscosity of the mass increased rapidly until at about −10° C. it set hard. In one case there was a definite flattening of the cooling curve at −10·2° C.

Two physical methods which have the advantage of being rapid and simple were calibrated against dry-weight determinations, *viz.* determinations of the density and refractive index, both at 20° C. For purposes of calibration the observations were made on extracts that had been filtered.

Density was determined both by calibrated hydrometers and by a specific gravity bottle

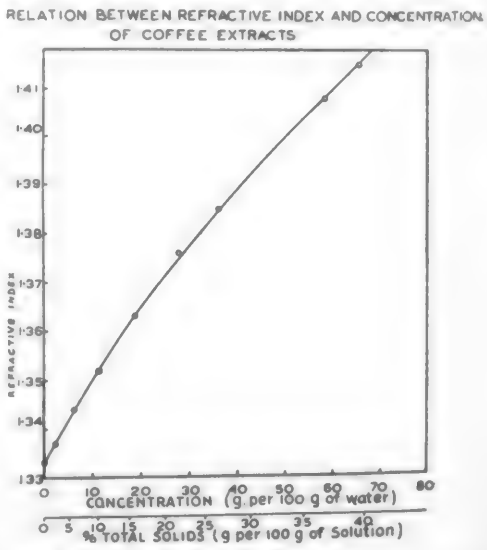

RELATION BETWEEN REFRACTIVE INDEX AND CONCENTRATION OF COFFEE EXTRACTS
REFRACTIVE INDEX
CONCENTRATION (g. per 100 g of water)
% TOTAL SOLIDS (g per 100 g of Solution)

Fig. 3.

(Fig. 2). The refractive index was read on a Zeiss direct-reading refractometer (Fig. 3) and, as a routine method for examining extracts during preparation, it was found advisable, when withdrawing a sample, to use a pipette with a cotton-wool filter at the tip, as suspended matter reduced the definition of the index line. With extracts containing more than 20 per cent. of solutes, definition was poor, resulting in a loss of accuracy.

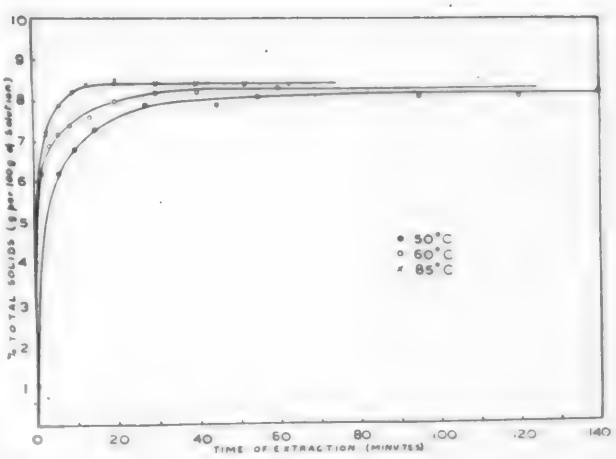


Fig. 4.

Extraction of Coffee

In making up various coffee extracts, observations were made of the effect of temperature on the rate of extraction, the effect of using different proportions of ground coffee and water, and methods of separating coffee extract from the grounds. Also, the details of a scheme of serial extraction to produce a concentrated extract and, at the same time, exhaust the coffee grounds were worked out with commercial blends of coffee of good average quality.

To follow the effect of temperature on the rate of extraction, 50 g. of ground coffee was mixed with 130 ml. of water in a stoppered, conical flask and held in a water bath at a definite temperature. At intervals, samples were removed and the refractive index was measured. The results are shown in Fig. 4 and are probably partly influenced by the degree of fineness to which the coffee had been ground, but, with the blends used, it was possible to obtain almost complete extraction at 80° to 85° C. in 20 min., and these conditions were chosen for future extractions.

Fig. 5 shows that the strength of the extract is inversely proportional to the amount of water used with a given weight of coffee. This graph includes observations made on two blends of coffee from different firms. Both blends contained about 12 g. of soluble material per 100 g. of coffee.

Serial Extraction

Freshly ground coffee contains only 1 to 2 per cent. of water; coffee grounds left to drain after soaking were found to contain about 60 per cent. by weight of water, which can be reduced to 40 per cent. by pressing or centrifuging. Obviously the liquid retained in the grounds and the liquid drained away will have, for all practical purposes, the same composition. The former can be removed either by serial extraction or by percolation on the counter-current principle. It was decided to aim at producing by serial extraction an extract containing 18 to 20 per cent. of solutes and to increase this percentage to about 36 per cent. by freezing.

Using batches of 454 g. of coffee and 800 ml. of water (approx. 1 lb. to 1·4 pints) serial extractions were carried out as shown diagrammatically in Fig. 6, the coffee being pressed between each operation. It will be noticed that by the time the fourth batch of coffee was reached there was a shortage of liquid and it was necessary to readjust the volumes for the next extraction. This shortage was partly due to a sediment of fine grounds that escaped through the press cloth. This amounted to about 35 g. for each extraction and was discarded.

TOTAL SOLIDS IN COFFEE EXTRACTS PREPARED WITH VARIOUS AMOUNTS OF WATER.

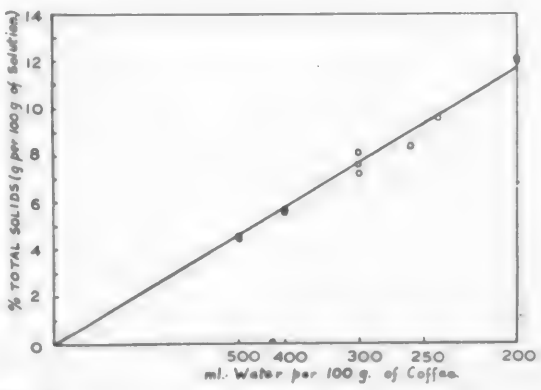


Fig. 5.

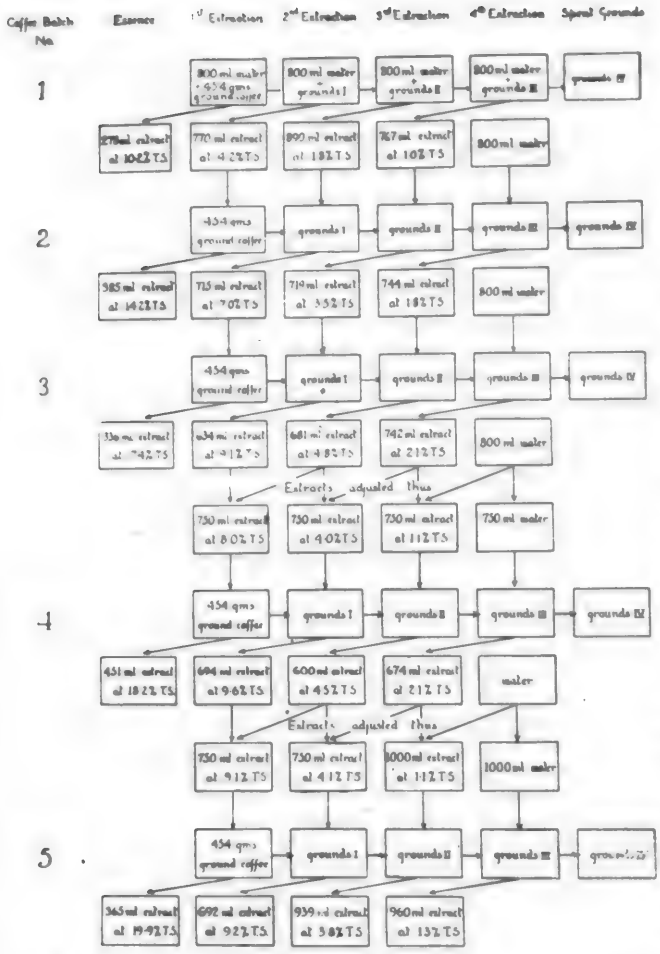


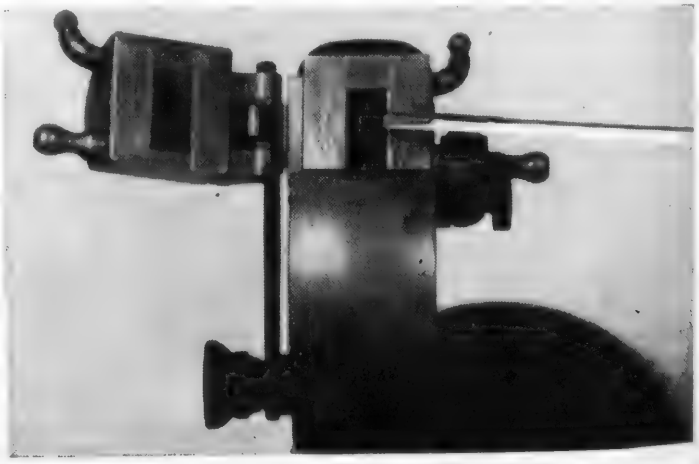
Fig. 6.

To overcome the need for the periodical readjustment of volumes, a second series was started in which the first batch of coffee was treated with 800 ml. of water in each extraction except the last, when the volume was increased to 1,000 ml. This series is shown diagrammatically in Fig. 7. Also, as a matter of interest, extracts containing as much as 32 and 38·4 per cent. of soluble solids were prepared by continued serial extraction.

Concentration by Freezing

An extract weighing 2,286 g., and containing 18 per cent. of solutes, was placed in a glass jar in a room at −10° C. and left for 5 days. The mass was broken up while still in the cold room and the mixture centrifuged in the laboratory at g. × 800 in lots of 500 g. for 3 min. The "ice" retained in the basket of the centrifuge was collected, well stirred, and re-centrifuged. This was repeated, the final residue of ice being allowed to thaw, and its volume and solid content noted. The weights of liquid extract at each stage, and the soluble solids in the extracts are shown on next page.

It seemed fairly evident that, in this instance, the considerable retention of solutes in Ice I was due to the formation of a solid solution resulting from the use of too low a temperature. By freezing at a slightly higher temperature, it was possible to obtain a much sharper separation of ice and concen-

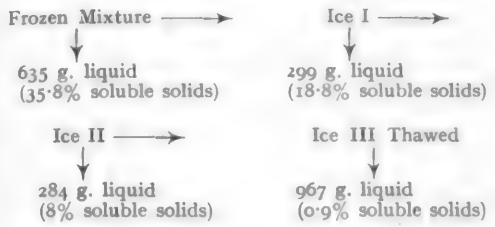


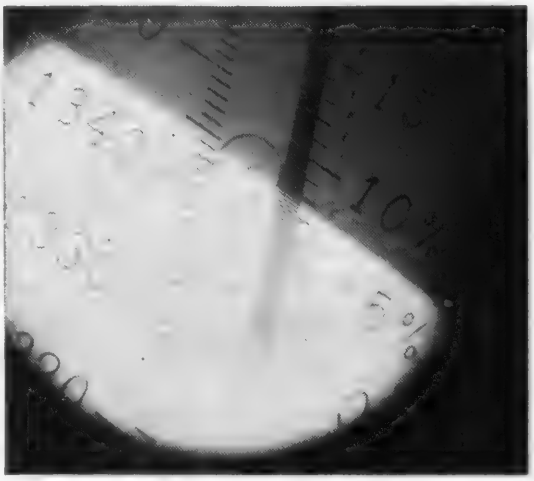
Zeiss refractometer opened to receive sample of liquid to be tested.

trate. Thus, when 1,846 g. of extract containing 15·8 per cent. solids were frozen in a room at −6° C. for 5 days and then broken up and centrifuged, the quantities obtained were

978 g. of liquid containing 27 per cent. solids and 868 g. of "ice."

When this ice was re-centrifuged it yielded 231 g. of liquid containing 6·9 per cent. of solids and left a residue of 637 g. containing only 0·8 per cent. of solutes.





Scale of Zeiss refractometer showing reading when liquid has a refractor index of 1·3442. The right-hand scale, marked in per cents., is for use with sugar solutions.

Caffein Content

No observations were made on the caffein content of either the ground coffee or the coffee extracts, but an indication of the concentrations of saturated solutions of caffein at temperatures of 0°, −5·5°, and −10° C. was obtained by preparing saturated solutions of caffein in super-saturated solutions of glucose at these temperatures. A solution containing 90 g. glucose and 1 per cent. of caffein in 100 ml. water was cooled to each of the above temperatures, seeded with caffein and, later, the clear liquid filtered off by means of an immersion filter. From results of nitrogen determinations the caffein content was calculated. The determinations were repeated on a solution containing 40 g. of glucose per 100 ml. of water. The solubility of caffein is seen on next page.

It is not unlikely that in coffee extracts these quantities could be exceeded because of the presence of gummy and tarry materials which reduce the tendency for super-saturated solutions to crystallise.

The experimental work was carried out by Mr. H. J. Shepherd and Mr. J. E. Robinson, and the nitrogen analyses by Mr. R. G. Westall.

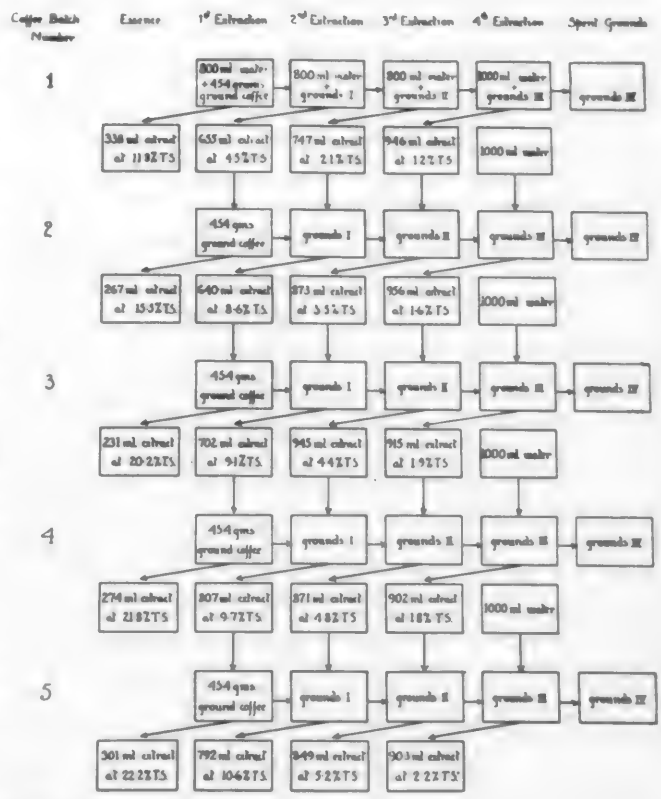


Fig. 7.

	g. Caffein per 100 ml. of Solution.	
Temp.° C.	*40 g. Glucose/100 ml.*	*90 g. Glucose/100 ml.*
0	0·55	0·44
−5·5	0·48	0·42
−10	0·33	0·36

The work described above was carried out as part of the programme of the Food Investigation Board, of the Department of Scientific and Industrial Research.

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Water Supplies

THE various sources of water supply and their relative suitability for supplying the needs of town and rural areas were discussed in a paper read by Professor H. L. Hawkins, F.R.S., at a meeting of the London and South-Eastern Counties' Section of the Royal Institute of Chemistry held at Reading on October 26, Dr. G. L. Riddell, chairman of the section, presiding.

Ultimate Sources

Professor Hawkins indicated that the ultimate sources of our water supplies are rain, snow, and dew. Precipitation is greatest on high ground, but most water is required on the plains. Mountain valleys invite the making of reservoirs, from which gravitation will assist the conduction of the impounded water to low-lying districts. Such supplies are dependent on the current weather, so that storage capacity must be adequate to tide over any possible drought.

The rocks of which lowlands are made are, as a rule, more absorbent than those which stand up as mountains. Absorption is a rather slow process, and in the summer-time evaporation, especially through plant transfusion, dissipates most of the rainfall. A misty day in winter "fills the wells" more effectively than a succession of thunder showers in summer. Saturation of the rocks does not ensure an adequate yield; the speed of percolation is the deciding factor. Chalk can absorb a vast amount of water; but unless open fissures occur no amount of pumping will extract an appreciable quantity.

With few exceptions, wells more than 500 feet deep either yield small supplies or water so rich in dissolved minerals as to be useless for most purposes. The relatively voluminous supplies often obtainable from shallower depths imply a freedom of flow that carries with it a risk of contamination and heavy pumping increases the risk.

Purification Treatment

Mr. Gordon Carey, F.R.I.C., then spoke on "The Chemical and Bacteriological Aspects of Water Supplies." Mr. Carey described the methods of purification and treatment which have resulted in such a great improvement in purity that deaths from typhoid fever have been reduced from 320 per million in the decade 1871-1880 to less than 5 per million in the period 1931-1940. Among newer developments, Mr. Gordon Carey mentioned "break-point" chlorination and the use of "microstraining" methods of filtration, which double the speed of "slow" sand filters by the incorporation of 40 to 80 micron stainless steel mesh. Dealing with the interpretation of chemical and bacteriological results, Mr. Carey stressed the need for a standard method of expressing results and suggested that the method used by Thresh, Beale, and Suckling should be adopted as standard. In conclusion, Mr. Carey made a strong plea that where possible bacteriological as well as chemical examinations of water should be entrusted to chemists.

Hydraulic Cheese Pressing

"MECHANICAL" openness of cheese, an irregular hole-like appearance usually present in cheese when it comes from the press, can be almost eliminated by hydraulic pressing, according to experiments made in New Zealand (Whitehead and Jones, *New Zealand Journal of Science and Technology*, 1946, **27**, p. 406). The pressure required is about 150 lb. per sq. in., to be kept constant for about 16 hours.

"Slit" openness, the type which develops gradually during storage, is not influenced by the type of press used.

Cheeses made in both hand and hydraulic presses were examined after 14 days and after 4 months. In all cases "slit" openness was evident, but only the former showed any amount of "mechanical" openness.

Although these experiments have not shown the actual cause of "mechanical" openness, the authors suggest that it may be due to an early evolution of gas in the cheese which tends to push apart the pieces of curd if the pressure slackens as in hand presses.

The Work and Aims of FAO

SPECIALLY CONTRIBUTED

During the last thirty years the world has swung as on a pendulum between recurring phases of prosperity and poverty, of boom and slump, of peace and war. At the present moment millions of mouths are crying out for bread. Many long-headed farmers, however, remember bitterly the days when the overproduction of grain caused prices to slump to catastrophic levels, when overflowing granaries were no safeguard against financial ruin. Sir John Boyd Orr, as Director General of the United Nations Food and Agriculture Organisation, seeks to lull the farmers' fears by proposals which will guarantee fixed prices for all their products, and which will allow needy countries to buy food supplies at special rates. He insists that international collaboration on food problems and an "all out" drive to increase food production throughout the world are absolutely essential if the return of war is to be avoided. Some critics may consider that civilisation has a poor chance of escape if its survival really depends on the full fruition of all Orr's plans, but few will deny that the present situation is most unsatisfactory and that action of some kind is urgently needed.

THE history of FAO, as outlined by Mr. David Lubbock at a recent meeting of The Nutrition Society, dates from October, 1945, when the Organisation was set up as an outcome of resolutions for improved nutrition put forward at the Hot Springs Conference and elsewhere. The inaugural meeting was held in Quebec, and representatives of the governments of forty-two nations attended. A crusade was thus set in motion to raise dietary standards throughout the world, to improve the production and distribution of food, and to secure better living conditions for those concerned in the production of food. These objects obviously demand a long-term policy, and the first activity of the organisation was to attend to the fundamentally important matter of setting up sound standards of reference. Various nutrition experts and official bodies were therefore asked to assist in the collection of data on the pre-war food consumption of different countries. A "yardstick" would thus be made available which could be used to measure both the effect of the war on nutritional status, and also the progress to be hoped for with the return of peace.

SIR JOHN BOYD ORR

While this essential ground work was being done, however, developments in the international food situation took place which necessitated the divergence of attention from the long-term programme to an immediate threat of acute starvation which seemed to threaten many parts of the world. Early in 1946 reports from UNRRA and other bodies responsible for finding food for the war-stricken areas indicated that, in addition to the chronic deficiency of food in certain regions, the world was about to experience an acute temporary shortage of wheat. FAO stepped boldly into the breach, and in February, 1946, a special meeting of delegates from many nations was summoned at Washington. All possible information regarding both supplies of wheat available for export and the

immediate requirements of countries which have to import wheat was collected and discussed. By encouraging the wheat-producing countries to increase their exports, and by discouraging the extravagant use of wheat for feeding animals, or for making flour of low extraction rate, the conference helped to circumvent a crisis which had given rise to widespread alarm.

A World Food Board?

In view of the urgency of this problem the annual conference of FAO was summoned two months earlier than had been scheduled, and in September many highly placed delegates from the interested nations met at Copenhagen. The importance of the occasion was marked by the attendance of both Mr. Strachey, Minister of Food, and Mr. Tom Williams, Minister of Agriculture, as representatives of Great Britain. Sir John Orr focused attention on the anomaly of the so-called over-production of food, which had caused so much financial chaos between the wars. Any produce above the requirements and purchasing capacity of normal markets, he emphasised, represented a mere fraction of the vast amounts needed to improve the lot of the undernourished races throughout the world. In effect "surplus" food was left to stagnate on a depressed market instead of being diverted to where it was really needed. There must be a world-wide drive for increased agricultural efficiency, and food production must not be shackled by short-sighted methods of finance.

Sir John proposed that a World Food Board should be set up, with aims which may be stated briefly as follows: (1) the assurance to the farmer of steady world prices for his commodities; (2) the accumulation of world reserves of wheat and other foodstuffs, to tide over future periods of emergency; (3) the avoidance of these reserves from piling up to excessive levels by the disposal of surpluses to needy nations under special financial arrangements; (4) the development of food production in backward countries where there is at present severe undernourishment. The matter now rests with a Preparatory Commission under the chairmanship of Mr. S. M. Bruce, F.R.S., an ex-prime minister of Australia. A draft plan is to be completed before the end of this year.

A Full Programme

While waiting hopefully for the formation of a World Food Board, however, FAO continues to press on with developments which come within the field of activities envisaged in its present constitution. It is interested in the collection and dissemination of expert information on nutrition, food production, and agriculture, and in the promotion of research, education, and the spread of public knowledge on these subjects. It has set up a standing committee of eleven members from various nations, with Lord Horder as chairman, and Dr. W. R. Aykroyd as secretary, to give expert advice on nutritional problems. It has declared its interest in food technology, the milling and processing of cereals, and the after effects of war dietaries on public health. Special attention has been given to the difficult question of correlating the results of food surveys carried out in different countries, the solution of which must lie in the adoption of standardised tables and of consistent methods in calculating food values.

Although unable to finance research by outside workers, FAO hopes to interest both individual investigators and official bodies in its problems. It proposes to organise teams, comprising nutritionists, agriculturists, economists, and sociologists, to visit countries where under-nourishment is rife, and to suggest ways and means by which the diet may be improved. It is busily compiling a list of nutrition experts throughout the world.

The Modern Atlas

An old Greek legend told how Atlas, standing on a mountain, held up the skies on his shoulders. As we realise the wide sphere of activities which FAO seeks to cover in its advisory capacity, and the immense executive powers which are sought for the World Food Board, it is possible to visualise its Director General, Sir John Orr, in an equally heroic role. How has this shrewd Aberdonian, so steadfast in purpose and so genial in manner, come to exert such force in international affairs? It is probably true that the formation of FAO has resulted largely from his inspiration, and by looking back at the various stages of his long and distinguished career we may be better able to comprehend the aims and ideals for which FAO stands.

Having both medical and scientific qualifications, Sir John has played a pioneer part in proving the relationship between sound nutrition and public health. With his great ability to "get things going," and to enlist influential support, he was the mainspring behind the foundation of the Rowett Research Institute, Aberdeen, the largest animal nutrition laboratory in this country. From its earliest days visiting workers were attracted from all parts of the empire, and for the dissemination of knowledge an Imperial Bureau of Animal Nutrition was set up. *Nutrition Abstracts and Reviews*, the journal of the Bureau, which reports current progress in both animal and human nutrition, is but one of the many successful ventures for which Orr may claim much of the credit. Even his spare time has been occupied in gaining valuable practical experience of agriculture by running a farm of his own.

The Poor Man's Champion

Possibly, however, the true reasons for the present prominence and influence of the Director General of FAO are to be found in factors which are humanitarian rather than scientific. He has always had real sympathy for those who are condemned by poverty to perpetual undernourishment, whether in this country or in the farthest parts of the earth. Such a conviction, backed by restless energy, great organising ability, and a pronounced flair for politics, generates a power which it is very hard to resist.

The information collected by FAO, however, was taken to indicate that the urgent shortage of wheat was not merely a 90 days' crisis, as had been expected. The scarcity of supplies might be even worse in the spring of 1947, and might persist for several years. Some form of international collaboration, preferably backed by executive as well as advisory powers, seemed imperative.

The publication of *Food, Health and Income* probably marked the first step in Orr's emergence from the scientist's laboratory to the wider arena of international politics. In this book, published some years before the war, he produced impressive evidence supporting the view that the lower income groups in this country were then living in a chronic state of undernourishment. Moreover he stated unequivocally that even if the poorer members of our population had shown the greatest possible wisdom in purchasing their food supplies their wages would not have been sufficient to procure an adequate diet.

In view of the distressing picture which was so clearly depicted it was not surprising that all political parties became both interested and concerned. Orr's own official entry into politics, however, was postponed until 1945, when he was elected as M.P. for the Scottish Universities. At about this time he resigned the Directorship of the Rowett Research Institute, and soon afterwards was appointed to his present position in FAO. In order to devote his whole attention to his new responsibilities he recently retired from his brief parliamentary career.

Static or Expanding Economy?

In regard to the economic background to agricultural production Orr visualises two alternatives. We may have a static economy, as before the war, in which the food produced by the farmers is more or less determined by the capacity of the market to absorb it. Under these conditions financial chaos can only be avoided by the caution of the farmers themselves against producing unwanted foods, a matter of combined guesswork and experience, or by a prearranged restriction in production under the control of the Government, or some other competent authority. Under this system the bounty of nature is restricted by the inelasticity of the financial system.

The other system, on which Orr pins his hopes of the world's future prosperity and peace, is an expanding economy in which, as we have already stated, the farmer is encouraged by guaranteed world prices to produce all the food he possibly can. In what appears to be a form of international socialism food which is not wanted by nations which can afford to buy it is passed on, under special financial terms, to those nations who need food but are unable to pay the guaranteed price. By this arrangement all nations are to become well nourished, with a corresponding increase in the general standards of living and happiness. Nutrition, therefore, may well be considered a test case of the possibility of collaboration and goodwill between nations. If they are unable to collaborate on matters vitally concerning their daily bread then agreement on any subject seems impossible, and it only remains for the world to drift towards total destruction in an even more terrible war.

The Middle Path

It is at this point that the more sceptical among us may wonder whether, after all, there is no middle path between Orr's Utopia and one vast atomic explosion. There seems no evidence that underfed nations are unduly warlike. Few, indeed, would consider that the Germans were particularly malnourished either in 1914 or in 1939. There appears, moreover, to be no reason why failure of complete international agreement over food supplies should be any more dangerous to peace than disagreement over many other subjects, such as territorial claims, reparations, and emigration.

Those among us whose minds incline to an even more critical angle may in addition have lurking doubts as to the practicability of Orr's scheme as a whole. Final judgment may well be suspended until the exact proposals for a World Food Board are made public, but there are certain implications of FAO policy which have not perhaps been adequately recognised. While the proposals for a better fed world would doubtless result in nothing but good if applied with caution and discrimination, their too drastic application might have undesirable consequences.

The Subsidy to Farmers

Perhaps the first point to be considered is the effect of guaranteed world prices for foodstuffs on the status of the agricultural community. By whom are prices to be fixed, and at what levels? On that decision, at least for a time, will depend the whole prosperity of the agricultural community. High

prices will certainly bring a smile to the farmer's face, and he will redouble his efforts to produce bumper crops. But what of workers in other industries, mine workers, mill operatives, black-coated workers, and the rest? They must pay for their food, either directly or partially in an indirect manner by taxation. More money to be paid to the farmers must increase the general cost of living, so industrial wages will rise, and before long the farmer and everyone else will be paying more for their manufactured goods. Any considerable improvement in agricultural prices would therefore be a further step in the universal inflation of currency.

The adoption of fixed prices for farm products might have another effect with undesirable features. Before the war the choice of crops was left to the farmer, and his ingenuity in predicting what products would be most needed, and at what times, was rewarded by correspondingly high prices. Every farmer had therefore to use his intelligence, and the sum of the intelligence of many farmers generally tended to produce the foods which the market most demanded. In future are we to make the farmer's intelligence superfluous by always directing him what to grow, or by allowing him to produce any commodity at any time? Will his produce always be accepted without question by an insatiable World Food Board?

If the farming community is to have this freedom then it would seem grossly unfair if the industrial communities of the more highly developed nations have not only to pay fixed prices for their food, but in addition should have to subsidise the transfer of surplus agricultural produce to less fortunate nations. There would seem to be a good case for sharing any losses caused by the sale of foods at special rates among the farmers, rather than among the community in general. With a stable market for most of his crop as an assurance against slumps the farmer should not object if a smaller part had to be sold at a lower price.

International Complications

A different form of difficulty in operating the proposed World Food Board might possibly arise from the tortuous deliberations and national rivalries which seem so often to reduce the progress of international conferences to that of a slow motion picture. If the Board has to maintain a high standard of international equity it will not be able to make hasty decisions. It would obviously be desirable, before granting nations permission to purchase food supplies from the world reserves, to judge carefully between rival claims for favourable treatment. Undoubtedly complicated issues would sooner or later become involved. The bewildered potentates of the more backward countries, for example, might find it very difficult to make an accurate statement of their food production and requirements, while even more highly developed countries might not always be above the temptation to manipulate their statistics in order to obtain preferential treatment. Success in operating the scheme, therefore, would depend on the ability of the Board to make its decisions both promptly and impartially, either by showing god-like wisdom, or by acting automatically on a "first come, first served" basis. It would also be essential for the nations to accept the Board's decisions, and willingly put them into effect.

Another pitfall to be avoided is the prospect of opening up an endless vista of international Black Markets. To take just one example we may imagine two adjoining nations, one of which has made a successful claim to the World Food Board for cheap food, and the other an unsuccessful claim. It may tax the ingenuity of the Board to ensure that there will be no unofficial channels through which cheap food obtained in the successful country can be passed on for sale at the full world price in the unsuccessful country.

The Oriental Hordes

We now come to perhaps the most serious, and most far-reaching implication of the proposed policy of the World Food Board. Under its provisions the feeding of backward nations is to be made a special responsibility. As already mentioned, it is suggested not only that teams of expert agriculturists and nutritionists should be sent out to attack the problem at its roots by advice on methods for increased local food production, but that these nations should receive special consideration in the allocation of food supplies from the Board at reduced rates.

It is only too true that gross undernutrition is widespread among many oriental races. With the spectre of famine walking abroad humanity demands that the starving should be saved from death. Many nutritionists take the view that there should be no more hesitation over giving food to the hungry than over treating an outbreak of cholera or some other foul plague. But what would be the effect of systematic supplies of food from the outside world, as opposed to the more radical cure of increased home production? Possibly we might expect improved nutrition for a few years, to be followed by an increase in population which would make matters worse than ever.

It is said in the Scriptures that man shall eat bread "by the sweat of his brow." Oriental brows may well be moistened by efforts to improve their agricultural methods, and to set their houses in order in many other ways under kindly and willing guidance from the West. But an undue amount of free feeding might lead to a state of affairs in

which the ability to eat and the ability to procreate would become the only factors in deciding which races shall inherit "the earth, and the fulness thereof." In the crowded East birth control is possibly more urgently needed than extra food.

A Complex Problem

We have painted FAO in white, symbolic of the elusive dove of Peace, and in black, which may represent those occult forces which often lie in wait to wreck even the best intentioned of mortal plans. Now let us consider our subject in terms of grey, a colour which suggests the cold granite of Aberdeen, and the sober common sense of its Director General. It is obvious that some form of international action is desirable, but how can success be achieved, and pitfalls avoided?

In the first place FAO must be aware of the delicacy of the task which lies before it. The production and distribution of food represents the life work of countless millions, and its degree of organisation must be very complex. Can a handful of scientists, however intellectually gifted, hope to succeed in rescuing the world from chaos when thousands of highly specialised merchants, admittedly activated by motives of profit rather than altruism, have failed? The answer may depend on the point at which their effort is to be applied. If it is seriously proposed that food experts should set themselves up as international corn chandlers, and proceed to dictate detailed policy to different countries on their exports, imports, and agricultural policy, then we may admire their courage but tremble at their chance of success. If however their main aims are to provide reliable information on the world food problems, and to suggest the broad outlines of possible political action, then we may be optimistic about the results.

A second important point is that the proposed World Food Board, in its ardour to reorganise the distribution of world food supplies, should not unduly interfere with any existing arrangements which are already proving satisfactory. Until the world is bound by closer political ties regional progress towards international co-operation, as by the bilateral agreements between friendly nations, should be warmly encouraged. The Board should be ready to help when help is needed. When its help is superfluous it should be content to leave well alone.

Our Own Position

Finally, let us confess to some degree of human weakness, and meditate on the probable effects of the proposed reformed international food policy on our own country. Since a high proportion of our food supplies are imported from overseas, it would appear that the fixing of high world prices would operate to our financial disadvantage, unless indeed we were to become so insolvent as to be granted special terms. It is doubtful, moreover, whether any fresh trade channels opened up by the World Food Board would be an improvement on those already available to us. On the other hand gross malnutrition is common in parts of the British Empire, and while we are still responsible for the welfare of India this problem remains a major issue. The governments and administrators in many parts of the Empire would presumably welcome the inauguration of the World Food Board if it were prepared to supply food at prices within their means.

For the ordinary British citizen, and his harassed wife, enthusiasm for a World Food Board might depend less upon political convictions than upon the strength and forcefulness of our representatives. Nothing would be more unfortunate than that our Minister of Food should delude himself into the belief that the optimistic medical reports of our state of nutrition can be extended to cover our psychological state. Bad food, and the bother of cooking it, have all too often undermined our tempers, even if they have failed to affect our physique. If therefore a World Food Board is to be set up it is sincerely to be hoped that our own representatives will not let their international enthusiasm obscure their plain duty. Britain's case for a better diet should be argued with all the force at their command.

Poultry Research

THE results of investigations on the riboflavin requirements of the chick by the Chemical Research Division of the Ministry of Agriculture are among the matters contained in the Nineteenth Annual Report of the Agricultural Research Institute of Northern Ireland at Hillsborough, Co. Down. All groups in the experiment were offered exactly the same mixture of meal, and different amounts of riboflavin. The results confirm those of the previous experiments, in placing the minimum requirements for optimum growth and for optimum food consumption at about 3·0 parts per million. Curled toe paralysis did not occur in groups fed more than 2·6 parts per million riboflavin, but it is felt that the results of this one experiment are not adequate in themselves to affect the previous conclusion that the level necessary to prevent this form of leg weakness is about 3·6 parts riboflavin per million parts food.

The riboflavin assays from the five tissues examined were in agreement with the results previously obtained on liver samples, in that the

maximum level in the tissues was reached when the ration contained about 4·0 parts riboflavin per million.

Another experiment dealt with sesame cake meal in rations for laying birds. The results have not yet been examined statistically, but general conclusions indicate that the changes in protein supplement have not had any appreciable effect on egg production. In other words, sesame cake meal would seem to be suitable as a protein supplement in rations for laying pullets on grass runs.

A new investigation has as its object the effects of iodinated casein on egg production and body weight of laying pullets under practical conditions. The Institute is prompted in this instance by work in the U.S.A. on the relations of the thyroid to egg production, which has received a stimulus from the development of iodinated proteins (iodinated casein, iodinated groundnut protein) which offers a convenient and readily available source of thyrotropic substance. At the time of writing, this experiment has unfortunately suffered owing to an appreciable incidence of "fowl paralysis" in the experimental groups.

Fruit and Vegetable Control

THE Canned Fruit and Vegetable Order, 1946, has been consolidated, with certain amendments of which the following is a summary.

Licensing.—The canning of the following varieties will continue to require a licence specifying in the case of each canner the quantity to be packed, etc.:

Apples
Blackcurrants
Cherries (other than May Duke, Morello, Kentish Red, and Flemish Red)
Gooseberries
Plums (including damsons and greengages)
Raspberries
Redcurrants
Strawberries
White currants
Beans in tomato sauce (with or without pork)
Beetroot
Carrots
Macaroni, spaghetti, or similar products
Macedoine (mixed vegetables)
Peas (fresh or processed)
Tomatoes
Vegetable salad in mayonnaise

Any other variety may be canned without a special licence and without restriction as to quantity by any firm or person already licensed to can fruit or vegetables.

The above restrictions do not apply to:

(*a*) canning otherwise than for sale (including sale after processing or manufacture, or as part of any other article);

(*b*) anyone who cans not more than 20 cwt. in all of fruit or vegetables, in any consecutive period of twelve months.

Prices.—The new maximum prices are slightly higher in some cases owing to increased costs. There are separate prices for home-produced and imported canned fruit, but the prices of canned vegetables apply both to home-produced and to imported varieties. Prices for canned apples and new prices for tomatoes will be added later.

For varieties not prescribed in the schedule to the Order, whether home-produced or imported, there will be no maximum price restrictions.

Standards.—The standards of container size and content at present prescribed in the First Schedule to the Order remain in force for the specified varieties when canned in the United Kingdom, but do not apply to other varieties nor to imports. Canned fruit and vegetables which do not comply with these standards must, however, be labelled with a statement of ingredients as required by the Labelling of Food (No. 2) Order, 1944.

Bottled Fruit.—Fruit bottled in spirit is removed from price control, which, however, continues to apply to other descriptions of bottled fruit and to bottled tomatoes, whether home-produced or imported.

The pH Influence

IT is a mistake to assume that the *p*H idea is one of those conventions that every young scientist takes in his or her stride. It may simplify figures that are otherwise cumbersome, but there is an awkwardly inverse relationship between hydrogen-ion concentration and its logarithm; and it is not easy to remember that quite small differences in *p*H values represent very big differences in hydrogen-ion quantity. The type of student who is drawn towards biology or biochemistry is often none too mathematically-minded, and there is frequently a long and painful period—sometimes concealed behind the iron curtain of pride—before the *p*H term becomes a part of understanding as well as of vocabulary.

The pH Convention

Indeed, one sometimes wonders how many scientists merely use the *p*H convention as a piece of numerical shorthand without bothering to think, even subconsciously, what lies behind it. It is not enough merely to remember that if the *p*H is low the H-ions are high and *vice versa*, and that 7·0 is the centre of gravity. Certainly this will not be enough for following Professor Small in his survey of the *p*H factor or influence. And, although the

author has described his book* as "an introduction for beginners," he seems to assume that his beginner has already and elsewhere made a pretty good start in physical chemistry.

For the scientific worker engaged in either food processing or food production, this book will be an invaluable guide and reference work. The title, "*p*H and Plants" might at first seem to restrict the subject matter to its agricultural or botanical aspects, but Professor Small has cast and dragged his nets in more seas than one. He is not concerned alone with the *p*H factor in relation to plant growth below soil level; he deals also with the significance of *p*H effects in plant metabolism, and his discussions are often carried forward to the stage that most interests the food scientist, the metabolism of plant products after harvesting.

Variety of Topics

The main sections are: *p*H and plant saps, together with *p*H changes induced by incidental carbon dioxide intake; *p*H and cell-walls, which includes a short discussion of pectic substances; *p*H and protoplast, including some reference to vitamins; *p*H and plant enzymes, with reference to such practical aspects as brewing, bread making, cacao bean roasting, coffee cultivation; *p*H and aquatic life, *e.g.* plankton, fauna and flora, freshwater and sea fish; a long chapter on soil *p*H effects; and relationships between *p*H and plant health or disease. Despite the catholic variety of these topics, each is treated with a wealth of facts and references; so thoroughly has this been done that at times one feels the author cannot be one man but must be a well organised bureau of research study and information. In the brief preface Professor Small disclaims completeness—against the background of voluminous *p*H literature he describes his book as a short survey giving samples over a wide field. This must be criticised, for the author is far too unassuming in his self-assessment; completeness and thoroughness are the very qualities that the book most seems to possess. One feels that little that really matters about the *p*H influence has been left out in the course of the author's selective campaign.

However, as will be apparent from this indication of the book's scope, it is not to be read at one or two sittings or scanned in 'bus or train. It is full of meat, and any attempt at rapid absorption will lead to an exhausting form of indigestion. But this must not deter the potential reader. The technical book that is easily read all too often carries a multitude of concealed sins; in a complex subject simplicity must always be suspect. Most biochemists would expect a solid book about *p*H effects to be fairly difficult. Also, many of the natural equilibria discussed are still imperfectly understood, so that the summary of facts Professor Small presents is often empirical rather than patterned.

Buffer Actions

The enormous significance of buffer actions in natural complexities is almost too obvious to mention. The author presses for these kinds of biochemical equilibria to be investigated not by titration curves but by the determination and plotting of buffer-index curves, *i.e.* buffer-indices plotted against *p*H values. He mentions "a curious reluctance on the part of workers to use this method of investigation as it might be used." From a general viewpoint this part of his book is perhaps the most important. The examples that he provides of the value of this method for studying sap solutions and juices will do much to remove the inhibition he criticises.

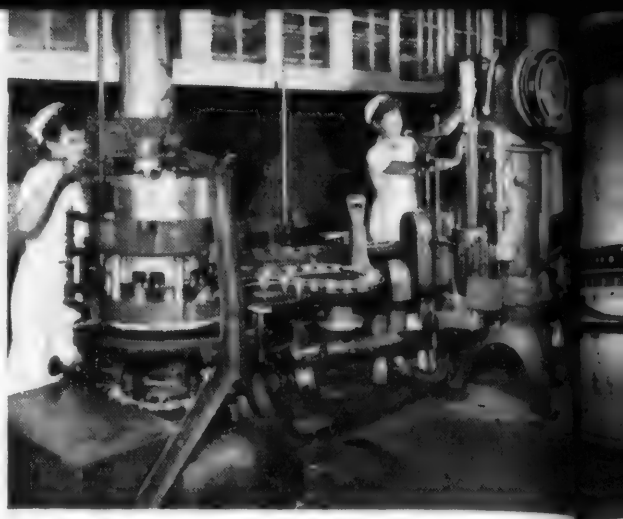
A new and interesting practical application comes from work on silage quality. It has been difficult to establish relationships between silage quality and *p*H measurements for silage extracts. But determination and plotting of the buffer-indices for the extracts has given a much more reliable correlation. Where several buffer effects can operate, mere *p*H values at any single stage in a changing balance bear only an empirical relationship to natural phenomena; but the buffer-index curve will reveal the "balance" of the various effects. By way of analogy (perhaps bad analogy) there is the difference between a two-dimensional and a three-dimensional picture. Any research worker who has come up against co-ordination troubles with natural *p*H values would do well to study chapter two of the book.

To indicate fuller references, there are just over twelve pages of selected bibliography, and the usual index. At the end of the text there are two appendices for "the non-mathematical beginner," but these are fairly concise, and one feels they would have been more useful at double their length; their position certainly would have been more obviously helpful as appendices placed at the end of the first chapter. The author, having set for himself the highest standard of academic science, does at times seem to expect a similar standard from the average reader. An introductory section giving a longer and slower approach to those who need it would be an improvement to subsequent editions. Nevertheless, author and publishers are to be commended for creating a book that will obviously be the leading reference work on the subject for a long time ahead.

D. P. HOPKINS.

* *pH and Plants*. By James Small, D.Sc., Ph.C., F.R.P.S., M.R.I.A., F.R.S.E. Pp. 214. London. 12s. 6d. net.

A standard beater-arm bakery mixer is used for the blending and ingredient-creaming operations, by which batter is introduced into a filler feed-hopper.



The batter is volumetrically filled into 3-oz. cans by means of a 6-pocket rotary filler. Covered with crimped-on lids, the cans are carried to a bakery oven.

CHRISTMAS PUDDING

FOR many years the time-honoured custom of making the Christmas pudding has been upheld by the family, each of its members having a hand in its mixing, and each sharing in the pleasures of anticipation before its arrival at the table. Charles Dickens in *A Christmas Carol* describes the immortal Mrs. Cratchit, prototype of all good housewives, as she left her family "to take the pudding up, and bring it in." The goose has been consumed and then: "Hallo! A great deal of steam! The pudding was out of the copper. A smell like washing day! That was the cloth. . . ." The pudding was a success as it arrived at the table "like a speckled cannon-ball, so hard and firm, blazing in half a quartern of ignited brandy, and bedight with Christmas holly stuck into the top" which, now it was produced, allayed Mrs. Cratchit's fears as to the quantity of flour.

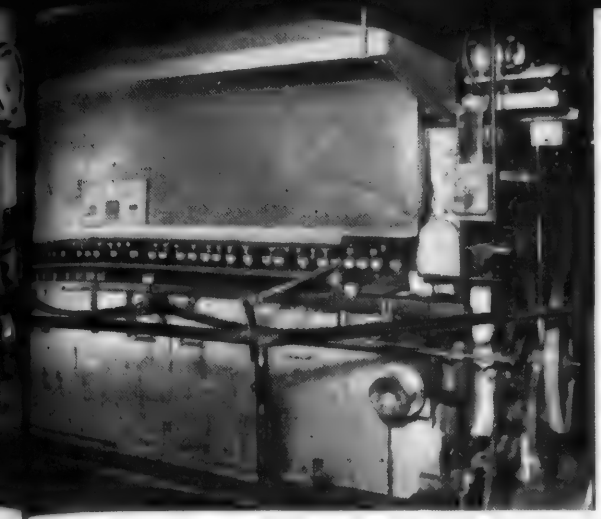
Present-Day Puddings

The Mrs. Cratchit of today has two different problems with which to contend—the sufficiency of her "points" and the whereabouts of her tin opener, not to mention the problem of the half-quartern of brandy.

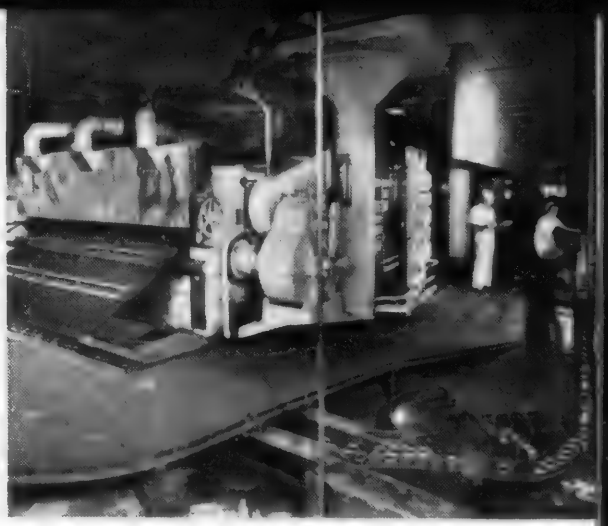
Even the Christmas pudding has fallen under the influence of this mechanical age. From America we learn of the development by the Kroger Grocery and Bakery Company, Cincinnati, Ohio, U.S.A., of a new kind of plum pudding which

The cans are passed between a micro-gauge and guide, the former activating an automatic thrust in order to brush aside all inverted cans.

Food Manufacture



A pusher-arm automatically loads the cans from the flat surface endless chain belt into the gas-fired flat-bed travelling oven with dimensions of 10 feet by 75 feet.



The hot cans are discharged on to an endless belt conveyor at the delivery end of the oven for conveyance to the double-seam closing machine.

is lighter than the usual commercial plum pudding.

Equipment Details

The bakery consists of a 10 ft. by 75 ft. flat-bed, gas-fired travelling oven, a 1,200 lb. capacity horizontal dough mixer with a standard beater-arm agitator used for blending operations, and finally a 6-pocket rotary filler by which batter is volumetrically filled into 3-oz. cans. The hot cans are discharged from the oven on to an endless belt conveyor and are transported to the double seam closing machine. Finally the closed cans reach a water spray compartment and air-blast zone of a cooling unit, where all the cooling and surface drying of the finished and sealed product is completed. Delivery cartons, sent by roller conveyors, wait at the closing and sealing station, filled with the sealed cans, and shipped to their destination.

Continuous Production

By means of this equipment, the company can put the canned plum pudding process on a continuous basis with the travelling oven as the keystone of the whole operation. All these units have to be planned and co-ordinated in a way that would lead to a 100 per cent. machine handling and complete operation.

The series of pictures shows step by step this interesting achievement of an up-to-date American food manufacturing plant.

THE EDITOR SENDS CORDIAL GREETINGS AND BEST WISHES FOR A MERRY CHRISTMAS TO ALL READERS AT HOME AND OVERSEAS

The cans reach a water spray compartment and air-blast zone of a cooling unit. Delivery cartons sent by roller conveyor are at the closing and sealing station.

World Grain Review

THE nutritive and economic importance of wheat was fully understood in antiquity. Two thousand three hundred years ago a young Greek called Glaucon cherished the ambition of becoming Governor of Athens. Seeking the patronage of Socrates, Glaucon called upon him and solicited his vote. Socrates, in order to find out the qualifications of the young candidate, asked him: "How much wheat would be required to feed the inhabitants of the town of Athens for one year?" As Glaucon was unable to answer the question, Socrates declined to vote for him and remarked that nobody was qualified to become a statesman who was ignorant of the problem of wheat. What a pity that modern politicians are not required to pass a similar test!

As centuries passed, the problems bearing on the production and distribution of food lost nothing of their importance. A task like that of feeding the people of Athens, a town which then consisted of ten thousand houses only, was a mere trifle compared with that of providing our present world with some 300,000,000,000 lb. of wheat yearly.

Purpose of Education

The purpose of education is not to make the student a monster of omniscience, but to teach him how to conduct fruitful investigations in any field of enquiry. The modern student of food problems, whether he happens to be an undergraduate or a Minister of State, has two main sources of information: the publications of the International Institute of Agriculture in Rome and those of the Food Research Institute at Stanford University, California. All food problems will in the future be dealt with by the Food and Agriculture Organisation in Washington, which has already absorbed the Rome Institute. Whoever wishes to pursue some special line of food research cannot do better than to consult the Food Research Institute, whose publications cover almost every aspect of human and animal nutrition; while those who wish to be continually informed on the supply and demand of the various grains, on crop outlook, on prices, etc., in all parts of the world, should read George Broomhall's *Corn Trade News*, a most authoritative publication established in Liverpool in 1888.

Food Research Institute

The Food Research Institute was founded in 1921 for research in the production, distribution, and consumption of food. Its erudite directors are Mr. Joseph S. Davis and Mr. Merrill K. Bennett, assisted by a staff of distinguished experts. They are the authors of studies in commodity policy, reviews on grains, fats, and oils, and of special monographs on many other kindred subjects. It is *Wheat Studies*, a periodical published for the last twenty-five years, that has brought the Institute a world-wide reputation. Its most recent publication* on wheat has been compiled by Miss Helen C. Farnsworth and Mr. V. P. Timoshenko. Whoever peruses this comprehensive volume will acquire a good general knowledge of the baffling intricacies of the world wheat problem. The volume is, in a sense, the fruit of twenty-five years of intense research made by the Institute.

World Competition

Before the first world war, most of the world was selling or buying wheat on the international market on competitive terms. Producers received nothing more than the world price, less handling and transport costs. But, since 1919, for political and other reasons, every government in the world interfered with the production or marketing of bread-grains. Unfortunately, all this official interference only made matters worse. The culminating point was the wheat crisis of 1929; it was the precursor of a general agricultural crisis; this degenerated into a world economic crisis; which, in its turn, led to the second world war.

This account is a necessary simplification of a very complex process. But it should never be forgotten that some 80 per cent. of the world's inhabitants are farmers and other primary producers. If these have no purchasing power, industry has no markets, trade stagnates, all professions are stricken, and the world gradually becomes a most uncomfortable place to live in. It should be remarked in passing that there is only one country in the world where more people are occupied in commerce than in farming, and that is England.

Distribution of Food

Yet it is certain that no human pursuit is more important than the production of food. The next most important is its distribution. On this subject there is a sharp conflict of opinion: some believe that the task should be left exclusively to the trader, others hold that the State and its functionaries should be entrusted with it. The latest project in this field is the establishment of a World Food Board, the object of which is nothing less than to ensure that sufficient food is produced and consumed throughout the world. It will have authority to fix prices of agricultural commodities in international trade, to establish reserves, to buy

* *World Grain Review and Outlook, 1945*. By Helen C. Farnsworth and V. P. Timoshenko. Pp. 319. U.S.A. $3.00.

up surpluses, and to distribute food to every country.

A charitable distribution of food is very necessary in the present emergency, and the building up of reserve stocks on which to draw in possible future emergencies—war or local famine—is equally desirable. International credits for agricultural and industrial development also should be encouraged. Yet it is more than doubtful whether the adoption of such a centrally planned and directed food policy is advisable and even possible in the long run.

Price Fixing

A Board entrusted with the fixing of prices and international distribution of the world's crops and other foodstuffs must soon break down, the more so since it cannot be vested with the power of legislation, execution, control, or sanction. Quite apart from the merits or demerits of price-fixing, how can the decisions of such a Board be effectively enforced on a world scale, in view of the fact that the comparatively simple International Wheat Agreements concluded up to now were either violated, like that of London of 1933, or proved altogether unworkable, like that of Washington of 1942? There is nothing more desirable than the establishment of a rudimentary World Government. But the main task of such a Government should be, apart from ensuring peace, to secure and maintain universal freedom of trade.

Wholesale Planning or Free Trade?

Both the establishment of the World Food Board and the policy of bulk buying by Great Britain of wheat in Canada and meat in Argentina, at prices fixed in advance, show that there are forces at work inimical to the restoration of the free world market and favourable to centralised planning as well as to the substitution of public authority for private trade. Bulk buying seems to be a foundation stone of the fortress in which the enemies of free trading are determined to entrench themselves.

Which of the systems to support, that of the wholesale planners, or that of the free traders, or else, that of a system combined of both, is one of the most important questions of the time, which everyone must resolve according to his conscience. Conscience, however, is not enough: there must be knowledge as well. Those who will peruse Miss Farnsworth's and Mr. Timoshenko's book, and will attentively study the tables prepared with great care by Miss Peirce, will certainly acquire the rudiments of that knowledge without which it is vain to enter into a discussion of the fundamental question—who should distribute the bounties of Nature: the private trader or the public functionary?—PAUL DE HEVESY.

Supplies of Fats and Oils

EXPORT supplies of fats, oils, and oilseeds from major world surplus-producing areas are estimated by the United States Department of Agriculture to be 1,200,000,000 lb. (545,000,000 kg.) higher in 1946 than in 1945. Although export supplies of copra in the Philippines and the "outer islands" of the East Indies, whale oil in the Antarctic, and linseed oil in Argentina are likely to increase materially in 1947, the report stated that total exports of fats, oils, and oilseeds from surplus-producing areas will still be well below pre-war supplies in 1947 and perhaps in 1948.

The 1946 world export supplies of fats, oils, and oilseeds are estimated by the Department at about 5,500,000,000 lb. (2,500,000,000 kg.), compared with about 4,300,000,000 lb. (1,950,400,000 kg.) in 1945 and a 1934-1938 average of 9,600,000,000 lb. (4,360,000,000 kg.).

Outlining some of the difficulties which prevent immediate restoration of pre-war export supplies, the report states that whale oil production in the Antarctic under international agreement is limited to about 60 per cent. of the pre-war level of 1,000,000,000 lb. (454,000,000 kg.). Export supplies of fats and oils in India will be less than pre-war levels because industrial development and increased consumer spending power in India have resulted in an increased consumption in that country. Strong domestic demands also are limiting exports in other surplus areas, such as Argentina and Brazil.

With political unrest still prevailing in Java and Sumatra, prospects are dim for resumption of exports of palm oil from the East Indies. It is uncertain when and in what quantity Manchurian soya beans and perilla seed will again be available in world trade, and it may be many months before China resumes exports of edible oils and tung oil in volume.

Output of whale oil in the Antarctic in early 1946 totalled about 300,000,000 lb. (140,000,000 kg.), whereas no oil was produced in the Antarctic in 1945. Exports of copra from the Philippine Islands in the first six months of 1946 totalled 190,000,000 lb. (86,000,000 kg.), in terms of oil. Philippine copra exports were negligible in 1945. The 1935-1939 average was 785,000,000 lb. (356,000,000 kg.), in terms of oil.

Exports of oils and fats from India are smaller this year than last, because of a short crop of flaxseed, an embargo on exports during much of the year, and an increased demand in that country, the report explained.

Discussing the outlook for increased export supplies in world surplus-producing areas in 1947, the report states that Philippine copra exports will be

greater in 1947 than in 1946 and may equal or exceed the pre-war volume of exports of oil and copra. Exports of copra and coconut oil from the Netherlands East Indies in 1947 will be substantially larger than the 100,000,000 lb. (45,000,000 kg.) estimated for the latter half of 1946. Pre-war exports were 748,000,000 lb. (340,000,000 kg.) (oil equivalent).

Whale oil output in the Antarctic in the 1946-1947 whaling season, under present international restrictions, could be increased to a maximum of around 600,000,000 lb. (270,000,000 kg.), about 300,000,000 lb. (140,000,000 kg.) more than the output in 1946. However, on the basis of the number of factory ships expected to be outfitted for the 1946-1947 expeditions, whale oil production in the Antarctic next season is more likely to be about 500,000,000 lb. (230,000,000 kg.), half as large as in 1935-1939 period.

Export supplies of fats and oils from Argentina may be materially larger in 1947 than in 1946, as relatively high prices to farmers probably will induce planting of large acreages, especially of flaxseed and sunflowers. With larger world export surpluses of fats and oils available in 1947, imports into the United States probably will increase. Exports from the United States, on the other hand, are likely to decline. A net import of fats and oils is likely for the United States. This would be the first net import since 1942, but the quantity of net imports would be small compared with the pre-war average of net imports totalling 1,500,000,000 lb. (680,000,000 kg.).

Discussing recent developments in the fats and oils situation, the report points out that in August, 1946, the United States Government signed agreements with the Philippine Government and with the Netherlands Indies Government concerning copra exports. Under the agreement the Philippine Government will grant export licences only to countries with allocations from the International Emergency Food Council. Similarly, the current supply of copra in the Netherlands East Indies is subject to allocation by the International Emergency Food Council.

CORRESPONDENCE

Graded Gelatine

TO THE EDITOR OF FOOD MANUFACTURE

DEAR SIR,—In the October issue of FOOD MANUFACTURE you print, on page 414, some observations on gelatine supplies made at a recent meeting of the Pork and Small Bacon Curers' Section of the National Federation of Meat Traders' Associations. You report that one of the speakers mentioned it has been suggested that different grades of gelatine should be guaranteed, but he did not know how gelatine could be graded. The answer is by the Alfred Adams' Grading System, as applied to our "Silver Stream" Graded Gelatines.

The reasons that prompted us to introduce our grading system are apparently much the same as those which the spokesman of the Pork and Small Bacon Curers had in mind when he commented on the lack of guaranteed grades. The comparatively small user of gelatine who cannot afford expensive instruments for testing every delivery, has, for a very long time, undoubtedly felt the want of a gelatine of guaranteed strength that could be absolutely depended upon.

We have, at the moment, a booklet in the course of preparation which fully explains our grading system. This booklet not only explains the system by which our gelatine is graded, but gives a lot of useful information to enable the consumer to get the very best out of his gelatine.

In the meantime, perhaps it is sufficient to say that by this system we grade the whole range of gelatines from the strongest to the weakest obtainable into seventeen basic grades, each with a guaranteed minimum jelly strength. This jelly strength, quoted in Bloom Grams Adams, is used as the basic grade number in the title of each grade. Other necessary characteristics are indicated in the same way in this grade number, the whole resulting in a specification of the quality of the gelatine supplied. This can be checked up by anyone with the necessary testing apparatus.

The spokesman in question is correct in pointing out that it is difficult to grade such abstract characteristics as colour and taste, but this difficulty is surmounted when the product is a branded gelatine. No gelatine, regardless of its jelly strength or setting ability, would be allowed to bear the edible symbol in our grading system unless it was quite suitable from the point of view of both colour and taste for edible purposes.

At the moment, like most other people in our trade, we are unable to take on any new customers owing to the acute scarcity of gelatine. As soon as the supply position improves, however, we hope that the information given here may assist the medium and small sized gelatine user.

G. H. MOORE,
Managing Director, Alfred Adams and Co., Ltd.

Food Review

A REVIEW of the world food situation shows that there are at least three critical areas—those of Western Germany and Austria, Rumania, and South-Eastern Asia. While the rest of the Balkan countries can probably rely on the recent harvest to see them through, provided they husband their resources, drought has seriously reduced the Rumanian crop. Imports will be required. On the other end of the scale, the situation in Southern India grows more doubtful as the weeks go by. Only the fact that the population of Malaya is far smaller makes the position in that area any more secure.

There were for a time rumours that the Chinese rice crop was a bumper one; it was said to be the best for twenty years. The last month has brought disillusion. Early in October the Chinese had agreed to divert rice shipments from Siam to India and Malaya. This arrangement was signed on condition that the loan would later be repaid. As it now seems, the harvest in China is less favourable than had been supposed. The total production is known to be 8 to 12 per cent. below normal; and some of the provinces have deficiencies of 40 per cent. In other words, at least a million tons of grain import will be required; and this raises considerably the estimated needs of Asia over the current crop year. In provinces north of Kwangsi many deaths from starvation are already reported.

The problem for India and Malaya has been that of obtaining shipments of rice from Burma and Siam. Grain shipments have arrived from other quarters, as from Brazil and Argentina; but they are not on a high level and the Australian rice crop is a poor one. The Burma position is by no means good. Rain in late August improved the crop prospects, especially in the south, though the north has experienced droughts. In October it was anticipated that the harvest of rice would reach about four million tons, a figure 25 per cent. above that for 1945. The acreage under rice cultivation has increased by the same proportion. If these prospects are fulfilled, there will be some 500,000 tons for export, less than a quarter of the pre-war level, but an improvement on 1946. Next year it is hoped to increase the cultivated area by a further 20 per cent. The latest information at the time of writing suggests rather more optimistic views on the coming harvest, but until more is known it is perhaps not safe to expect so high an export surplus as a million tons.

The Siamese difficulties have been of another order. There is rice available in Siam, but much of it has been disappearing into an obscure black market. For some months deliveries to the authorities for reparations exports have fallen well below the promised level. Frequently they have been half expectation or less than half. More drastic steps were taken in September by the Siamese authorities, both against hoarding and against the traffic in rice across the frontiers. Various governors and officials were suspended for their part in these smuggling operations, which seem to have diverted nearly 100,000 tons of rice in three months. In October there was a distinct improvement in deliveries. But meanwhile there are reports from the southern part of the country of a rice shortage, which has had to be met by rationing supplies.

In India the food shortage had by the beginning of October reduced the country to three weeks' supply. Since then further shipments have reached the country, but they are considered insufficient. The agreed export of 150,000 tons of rice per month from Indonesia was for a time held up through lack of internal transport; but efforts have been made to overcome this. By the end of October the deficiency in Southern India was said to cover about fifty million people. In Bombay the situation was easier; but floods in Assam have resulted in widespread devastation affecting 200,000 villagers and seriously reducing the food supplies. Until the close of January, when the new rice harvest can be assessed, the position in Madras will be critical, and by the time these comments are published there may well be areas of starvation worse than the country has so far experienced.

Lye Peeling of Vegetables

UNTIL fairly recently the most widely used method of preparing root vegetables for processing on a factory scale was to pass them over abrasive rollers revolving under water sprays. Disadvantages of this method are that rollers cannot deal with concave portions of the vegetables and eyes, etc., which makes hand-trimming after peeling necessary, and that too much of the flesh of the vegetable is unavoidably cut away.

During the war a new method was adopted which did not have these defects. It was to immerse the vegetables in a boiling solution of caustic soda (lye) and then wash off the disintegrated skins by means of high-pressure sprays. Mechanical breakdown of the machinery was, however, until recently, the chief disadvantage of this method. Now, Thurber and Bohne (*Food Industries*, 1946, **18**, 10) claim to have overcome even this drawback with the development of a new type of lye peeler, the advantages of which are claimed to be a simple mechanism, avoidance of skin abrasion, prevention of loss of lye and heat, since the unit is totally enclosed, and automatic regulation of the bath temperature.

Food Afloat

INSTALLATIONS ON THE *QUEEN ELIZABETH*

The handling, storage, and preparation of food on a modern luxury passenger liner resembles closely the conditions involved in luxury hotel management, except that the organisation must be so perfected that the liner is a self-contained unit independent of any shore service.

The Cunard White Star Line has been long famed for its cuisine, and a visit to the *Queen Elizabeth* prior to her maiden peacetime voyage showed the extent of the service for providing food for some 2,300 passengers.

At the end of a voyage the Chief Steward reports to the Catering Superintendent on shore the quantities of food remaining, and an estimate of the required amounts for the next voyage. These must be delivered in rotation to the port at a given time to permit loading to proceed smoothly and to avoid delay of the liner and in such a manner as to avoid any last-minute problems. Deliveries normally commence one or two days previous to sailing, the dry stores being loaded first and the fresh stores at the last possible moment to ensure the maximum condition during the voyage. It is a matter of policy on this Atlantic run to load fresh food, wherever possible, in preference to processed food. A definitely high standard of quality is fixed and any stores below that standard are rejected.

The butcher has in his shop a whole range of meat stores in addition to two fish houses. There are chills for cold meats, poultry, and fresh meats, and the fresh carcase beef is always hung. One poultry chill room is used for fresh plucked birds and the other for frozen birds, while the cold meat room includes various types of meats located one type to a shelf. All these chill rooms are large and have external controls. All the meat is prepared for the chefs in this butcher's shop, a staff of twelve experts cutting and carving the meat as required. A special concession is made by the British Government to such ocean-going passenger ships on the grounds of national prestige. For these reasons catering and food are at a definitely high level, despite the admitted stringency which the normal Britisher experiences.

The bakery on board, with a staff of twelve, stores its own requirements except where these are drawn from the central stores. Here, again, conditions are vastly superior to the normal British standards; there are some eighteen types of bread baked daily, and the bakery also handles milk puddings, pies, and similar requirements.

The galley premises are of modern style, with stainless steel and monel metal dominating the scene. The kitchens are all-electric and mechanisation has been extensively used. Around some of the galleys, steel grids are used to allow the emission of cooking odours and heat, while a most interesting use of storage space for completed meals is shown round the various stoves, grills, pans, and boilers. The layout is so planned that there is also similar space, under the counters, for either ice cold or piping hot dishes, the stewards circulating around the service bars and receiving the food from the galley staff.

Some 10,000 meals are served daily on this liner, while bars, grills, and other facilities continue almost without respite dependent on the demands of the passengers carried. There are facilities for special food for all sects, religions, and nationalities, not only at normal meal times but at unusual times. Only by the most perfect management of handling, storage, and preparation, and by the maximum use of mechanised equipment could this be made possible.

The electrical requirements of the hotel services are supplied from four 2,200 kw. generators, the power being distributed throughout the ship from four main switchboards. These services include the illuminative and decorative lighting, electric heating, electric cooking, motor-driven ventilating fans, motor-driven pumps for hot and cold water services, sanitary services, refrigerators, dumb waiters, cabin fans, etc. Saturated steam for hotel

The bakery on board the "Queen Elizabeth."

services, *e.g.* heating and cooking, is supplied from four of the main water-tube boilers equipped with de-superheaters. The hotel services equipment include: electrically operated refrigerators, cold fresh-water system—2 pumps, hot fresh-water system—4 pumps, culinary water system—2 pumps, drinking water system and filters —2 pumps, iced water system, refrigerator brine circulating pumps, and refrigerator condenser circulating pumps.

The Cake and Biscuit Manufacturers' War-Time Alliance, Ltd.

The ramifications of the biscuit industry during the year are set out in the recently published Report of the Council of the Cake and Biscuit Manufacturers' War-Time Alliance, Ltd., for the year ended June 30, 1946, presented at the fifth Annual General Meeting of the Alliance on October 25, 1946.

The activities of the Alliance may be assessed by the fact that there are twenty-five active committees appointed by the Council.

A copy of the balance sheets and auditors' report, together with the income and expenditure account for the year ended June 30, 1946, form part of the Report and, where possible, comparative figures for the year 1944-1945 are shown in the accounts.

Voice and Vision

Films, radio, press information, film-strip, exhibitions, and employers' welfare and training schemes are among the activities handled by a new company, Voice and Vision, Ltd. The Company owes its inception to the increased interest which is being shown in specialised media.

National Adhesives, Ltd.

Mr. Arthur Williams, Director in charge of sales of National Adhesives, Ltd., has just returned from America on the *Queen Elizabeth* after visiting their Associated Companies in America and Canada.

Trade Visit

Captain R. Alcock, of W. J. Alcock of Calcutta, who is now on a visit to this country, will be pleased to meet British manufacturers to discuss plans and arrangements in India. Until an office is found in London, enquiries should be addressed c/o Leonard Hill, Ltd., 17, Stratford Place, London, W.1.

Institute of Brewing

The following are the arrangements for the 1946-1947 Session of the London Section of the Institute of Brewing:

1946.

December 9. "The 1946 Barleys of Yorkshire and the Northern Counties." Mr. W. Stannard.

1947.

January 13. "Oil Firing." Mr. W. A. Hubbard, M. Inst. Petroleum, M. Inst. Fuel.

February 10. "Modern Developments in Malting Mechanisation." Mr. W. Hynard.

April 14. "U.S.A. Review." Mr. A. J. Curtin Cosbie, B.Sc., A.R.I.C., A.R.C.Sc.I.

Society of Instrument Technology

The following are details of meetings of the London Section of the Society of Instrument Technology for 1947:

Tuesday, January 28. "Some Applications of Electronics in the Iron and Steel Industry," W. C. Fahie, M.Sc. (British Iron and Steel Research Association).

Tuesday, February 25. "The Reliability of Small Electrical Apparatus," A. C. Lynch, M.A. (Post Office Engineering Research Station).

Tuesday, March 25. "Electronics in Non-destructive Testing," R. Meakin, B.Sc., A.Inst.P. (Armament Research Department, Ministry of Supply).

Tuesday, April 29. "Molten Metal Temperature Measurement," J. A. Hall, A.R.C.S., B.Sc., D.I.C. (National Physical Laboratory).

All meetings will be held at the Royal Society of Tropical Medicine and Hygiene, Manson House, Portland Place, W.1, and will commence at 7 p.m.

Ozone in Industry

Covering the use of ozone for deodorising and revitalising polluted air, preventing taint and mould growth, better preservation of foodstuffs, and the sterilisation of water supplies, the Visco Engineering Co., Ltd., have issued a new leaflet (No. 466) describing Viscozone generators and their use in this sphere.

Packaging Competition

A £1,000 packaging competition sponsored by the Metal Box Co., Ltd., and organised by the Central Institute of Art and Design, is divided into two sections as follows:

Section 1. Open to art students and professional designers resident and practising in Great Britain.

Section 2. Open to anyone resident in Great Britain, excluding those qualified for Section 1.

Suggestions and designs for any package relative to commodities generally sold through grocers, chemists, stationers, ironmongers, and the motor trade are required.

The closing date is January 4, 1947, and particulars may be obtained from the Central Institute of Art and Design.

Review of Year's Progress

Sir Robert Leighton, chairman of the Printing and Allied Trades Research Association, presided at the sixteenth Annual General Meeting of PATRA at the Federation of Master Printers' Offices on October 23.

The Annual Report for 1945-1946 was presented and accepted. The chairman briefly surveyed highlights of the year's work and progress, and the following members of the Council were newly elected:

Mr. G. M. Ashwell, of Imperial Chemical Industries, Ltd.; Dr. J. Grant, M.Sc., F.R.I.C., of Thomas Owen and Co., Ltd.; Mr. G. Wren Howard, M.C., M.A., of The Publishers Association; and Mr. G. B. C. Johnston, of Wiggins, Teape and Co. (1919), Ltd. Sir Robert Leighton was re-elected chairman of PATRA.

OBITUARY

Mrs. J. E. Fox

We regret to announce the death, after a long and painful illness, of the Honorary Organising Secretary of the Food Education Society, Mrs. J. E. Fox.

One of her colleagues writes: "There can be few members who have given longer service to the Society. As Honorary Assistant to Mr. Hecht during his failing years, as Honorary Secretary after his death, which followed the loss by enemy action of almost all the Society's assets, and subsequently during the reconstruction, Mrs. Fox worked valiantly and ungrudgingly, never failing to accept responsibility or to draw on her considerable experience of the Society's efforts to give advice.

After the reconstruction she was the main organiser of several conferences, a long list of lectures, and many other activities carried to success during subsequent years.

Mrs. Fox had abilities of a high order. Her service was generous. Her courage never failed. Her faith remained steadfast. She has left an example to follow."

World Engineering Conference

Arising out of the International Technical Congress held in Paris September 16 to 21, 1946, the delegates and observers from thirty nations, appointed by the various Governments and National Engineering Institutions and Associations, unanimously adopted the following resolution:

"To establish an international organisation under the name of 'World Engineering Conference' constituted under the French Law of July 1, 1901, continuing from the date of its legal establishment the existing organisation now known as 'International Technical Congress.'"

The principal objects of the Conference are:

(*a*) To prepare for the establishment of the future World Engineering Federation.

(*b*) To assure, if need be, the holding of future International Engineering Congresses.

(*c*) To establish contact especially with the Economic Social Council of the United Nations Organisation and with UNESCO.

The Council, composed of two delegates appointed by the National Committees or by agreement between the Engineering Institutions or Associations who are members of the Conference, will elect an Executive Board, with a maximum of twelve members and a President, who will administer the Conference.

A provisional Board, comprising delegates from nine countries, was appointed, whose duty will be to prepare the constitution and to form the Conference.

Mr. A. Antoine, *Inspecteur Général à l'Electricité de France*, President of the Congress, was unanimously elected the first President of the Conference, with Mr. W. R. Howard, Great Britain, and Mr. P. Soutter, Switzerland, as Vice-Presidents.

Road Transport

Speaking of the future of the transport industry and the threat of nationalisation at the "Carry On Road Transport" Exhibition in London, Captain the Right Hon. Lord Teynham, D.S.O., D.S.C., R.N. (Retd.), chairman of the House of Lords Road Group, said that the transport industry was willing to stand or fall by a Public Enquiry and maintained that the industry was justified in calling on the Government to have such an enquiry because it was efficient, and undoubtedly if this industry were nationalised it would be wrapped up in a network of red tape and the whole organisation of the industry would be slowed down. The small trader would also suffer and find that the personal touch, so necessary in the delivery of his goods, would not exist any longer. He would have to rely on a form-filling organisation which may not deliver his goods to time or in good condition. The public would suffer for the same reason, the general life of the country would be slowed down, and industry would suffer irreparable harm.

Aluminium Linings for Fish Holds

Sheet aluminium linings are being installed in the fish holds of a number of trawlers now under construction in Scotland. This new experiment is intended particularly for trawlers remaining several days at sea, whereby fish will be kept fresher and cleaner than is possible with wood-lined holds.

The firm concerned is Unitas (Dundee), Ltd., who are at present building two motor fishing vessels of this type. They believe that aluminium will be used extensively in the future because it is bacteria-proof.

Self-Adhesive Tapes

The use of self-adhesive tape in the packaging field is growing so rapidly that manufacturers are finding difficulty in coping with the demand. These tapes stick to any surface by mere pressure, and are equally effective on paper, board, glass, metal, plastic, or transparent film. The most popular base material is cellulose, as this can be made in a variety of fine transparent and opaque colours, and is in addition very pliable, moulding itself readily to the flanges or other irregularities of the pack. These tapes do not peel off, but can be readily removed from hard surfaces without leaving marks.

Apart from a wide range of colours, cellulose tapes can now be obtained overprinted to any special design. This development is of obvious importance from the publicity and "sales-appeal" angle.

One manufacturer stocks a range of eight transparent and opaque colours in cellulose self-adhesive tapes, in widths from ½ in. to 2 in. These are normally stocked in rolls of 36 or 72 yards, or in rolls of 125 yards for use on automatic sealing machines. Special sizes and colours can normally be made. Hand dispensers and semi-automatic dispensers are available from the manufacturers, Industrial Tapes, Ltd., and for large outputs fully automatic sealing machines are on the market.

Lyons International Fair

The next Lyons Fair takes place from April 12 to 21, 1947, under the Presidency of M. Edouard Herriot. This will be the second post-war opening, the first having taken place last April, only six months after the Exhibition buildings had been de-requisitioned. Several improvements have been planned which will make the Lyons Fair of 1947 bigger and more attractive than any of its predecessors.

The Exhibition will be truly representative of French industry as a whole, and many other countries will exhibit.

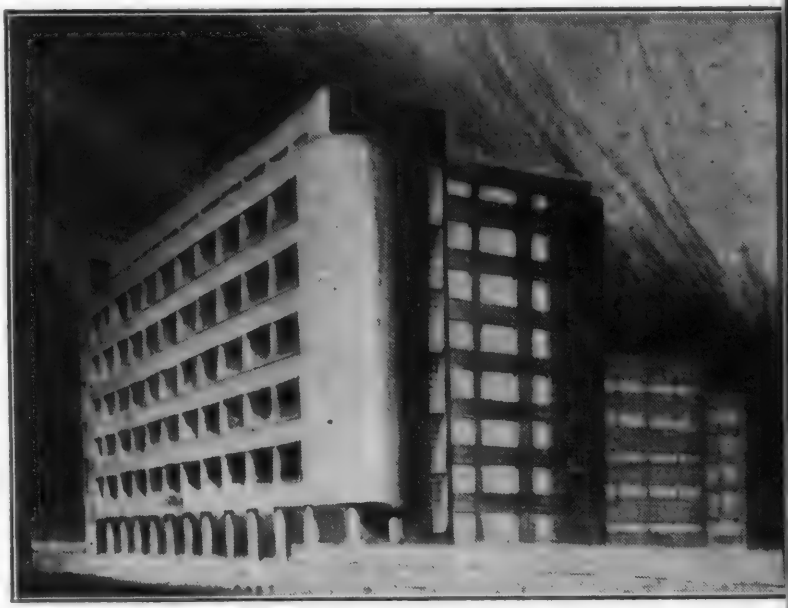
V-Belt Manual

In issuing a new manual J. H. Fenner and Co., Ltd., have endeavoured to make it a complete textbook on V-belt driving. The very simple standard drive selection tables, a feature of earlier catalogues, have been retained, but modified to give the actual horse power which the selected number of V-belts is capable of transmitting under each set of conditions selected by the user. This additional information has been included without in any way affecting the simplicity of the tables.

There are full descriptions of the latest "Fenner" V-belts developed for special conditions, one of which is a combined, anti-static, heat and oil resisting V-belt, the other two having steel cables and rayon cords respectively. The opportunity has also been taken throughout this new catalogue to revise the V-belt symbol numbers to bring these into line with those adopted for the proposed British Standards Specification which is now under consideration. Additional information has been given on the standard designed pulleys and the range carried by the various Fenner branches. For the designing of V-belt drives from first principles, greatly extended horse power tables have been included, and these enable full advantage to be taken of larger diameter pulleys where these can be installed.

Smithfield Institute Comes of Age

TRAINING IN FOOD TECHNOLOGY



From its humble beginnings in 1923 in the parlour of an old house in Cedars Road, Battersea, London, the Smithfield Institute, or, as it is in future to be known, the Smithfield College of Food Technology, has emerged stronger than ever before and its scope in the coming years will be constantly widened.

Much of the success of the Institute today is due to Mr. Walter Nevell who, realising the need for technical education, worked hard to bring his ideas before the trade and the London County Council, encouraged by Mr. R. C. Hammett, now a member of the Court of Common Council of the City Corporation. Mr. Nevell, who died in 1939, was succeeded by Dr. Evan J. Evans, M.Sc., Ph.D., who has carried on the work under many difficulties. During the war the premises in Saffron Hill were badly damaged, and work had to be continued in a one-time elementary school in Eagle Court, St. John's Lane, London. A further difficulty was that the junior section had to be evacuated; but all these vicissitudes were faced and tackled by Dr. Evans with the support of his staff, and in particular with the help of Mr. Frank Gerrard, an original student under the founder. Both Dr. Evans and Mr. Gerrard have now been appointed to the Council of the recently inaugurated national Institute of Meat.

A study of the current syllabus, which may be obtained on application to the Principal, indicates that the College of Food Technology is not confining its efforts to the meat trade; bacon curing, meat preservation, fish, fruit and vegetable, milk, and other industries will in future be catered for, and in some instances classes are already in being or in the course of formation. Both the present accommodation and the original plan for Saffron Hill are inadequate for the full fruition of the scheme, and the L.C.C. has already given instructions for a new site to be found on which a more fitting edifice will be erected. The illustration of the handsome building shows a perspective based on a set of plans prepared for one possible site.

Changes of Address

The works and offices of the Whitehead Chemical Co., Ltd., are now situated at: Holt Mill Road, Waterfoot, Lancashire. Tel.: Rossendale 1052.

■

Britannia Batteries, Ltd., makers of Alklum and Britannia batteries, have moved to new offices at: Trafalgar House, 9, Great Newport Street, London, W.C.2. Tel.: Temple Bar 2354-5.

■

Mercantile Credit Co., Ltd., have now removed from their temporary war-time offices at 208A, Regent Street, London, W.1, to new offices at Argyll House, 246-250, Regent Street, London, W.1.

■

With a view to consolidating the whole of the Company's London Office facilities in one building, Newton, Chambers and Co., Ltd., are transferring the activities of the ironworks section of their business to Grand Buildings, Trafalgar Square, London, W.C.2. Tel.: Abbey 5865, 6, and 7, and Whitehall 4130.

The British Cake and Biscuit Association

The handbook for 1946 of the British Cake and Biscuit Association containing the report of the Executive Committee for the year ending May 31, 1946, has recently been issued. Among a large number of items tabulated is a report on the Baking Wages Council, which records an increase of wages and a guaranteed week throughout the industry.

The British Baking Industries' Research Association has now finalised its preliminary work and is assured of Government support. It will render a twofold service: firstly, immediate assistance to its members in the production difficulties which may face them; secondly, the results of its research into many production problems of the industry with a view to a long-term policy.

The de-zoning of biscuits which became operative on April 27 was not unanimously welcomed, some manufacturers holding the view that biscuit zoning should continue in operation until ingredients were more freely available, although the majority of manufacturers were of the opinion that distributive markets should be freed as quickly as possible. The Transport and Distribution Committee of the Association organised de-zoning with the distinct understanding that there should be no cut in ingredients, but it has to be recorded that five days after de-zoning became operative, the Ministry of Food announced not only a cut in fat but also a reduction of 25 per cent. in biscuit production.

The Report states that it would be idle to attempt to forecast the prospects for the year 1946-1947, and points out that the outlook regarding flour and fat is depressing in the extreme. The sugar situation would appear to be a little brighter and there seems to be no great fear of a shortage.

Ancillary ingredients show signs of gradually trickling back, although the high prices demanded may prevent the manufacturer making full use of them unless the Government permits some relaxation in their restrictions on selling prices.

OBITER DICTA

● Some prisoners of war on farms have become too fat to work.—*Mr. A. J. Bucknell speaking to farmers at Maidenhead.*

● Are we to sell 300 years of Empire development for dried eggs and the dehydrated products of Metro-Goldwyn-Mayer? —*Mr. Basil Webb, M.P.*

● If my son, who works two land machines, could ride on the machines, he would get the extra cheese ration, but not if he walked behind them.—*Correspondent to the "Sunday Express."*

● Milk drunk before whisky, we read, prevents the latter from having any effect. Red noses, will, it is thought, now qualify their owners for the milk priority list.—*"Punch."*

● For several reasons biscuits are unlike that noxious and mysterious concoction which masquerades under the fine British name of bread.—*Mr. Allighan, M.P.*

● It seems rather odd that we should be sending flour abroad and that it should apparently be coming back to us in the form of biscuits.—*Lieut.-Commander Clark Hutchison, M.P.*

● I imagine that under Socialism cocks will lay eggs. After all we see in the feathered world the results of artificial nationalisation. — *Lieut.-Commander Gurney Braithwaite, M.P.*

● A man is already half dead if he spends his life fussing about routine day-to-day matters. He lives when he is concerned with the deepening of his knowledge, the expansion of his ideas, the strengthening of his mind.—*Mr. J. Twomey, speaking at the Manchester Flour Milling Students' Society.*

● Mr. Dalton says, when he looks at the financial position of this country, that he has a song in his heart. I would like to tell him that when we look at our personal financial position we have a pain in the neck.—*Bishop of Chelmsford.*

British Sugar Corporation

At the tenth annual ordinary general meeting of the British Sugar Corporation, Ltd., Lieut.-Colonel Sir Francis Humphreys, G.C.M.G., G.C.V.O., K.B.E., C.I.E. (chairman), presiding, it was shown in the chairman's address circulated with the report and accounts that the Directors recommended that a dividend for the year of 4½ per cent., less tax, be paid, absorbing £123,750, and that the balance of £34,836 be carried forward.

Weston Foods

Weston Foods announce a final dividend of 5 per cent. and a bonus of 10 per cent., both less tax, on the Ordinary shares in respect of the 39 weeks to March 30, 1946.

Canada's Salmon Industry

HOPES FOR INCREASED CATCHES

British Columbia's salmon factories have been preparing to send the greater part of their 1946 pack to the United Kingdom, and figures may reach those of the best export years.

During 1940-1945 the demand by the Forces for canned fish was extremely heavy, resulting in developments in British Columbia canned herring and salmon, the increase being sevenfold as compared with pre-war. The total amount of canned fish put up in Canada for the year ending June 30, 1946, is estimated at 161,000,000 lb., of which about 90,000,000 lb. were booked for the United Kingdom and 40,000,000 lb. for UNRRA. Of the 1,740,000 cases of salmon packed in 1945, 300,000 were held for Canadian civilian consumption.

Means have been taken to make it easier for salmon to return to their birthplaces in British Columbia, particularly in the famous Fraser River, where obstructions in what is known as Hell's Gate have been removed. As a result, the number of salmon taken is expected to be greater in the future than in the best years of the past. When salmon are spawned in the upper reaches of the river and lake systems connecting with the Fraser, they spend a year in their "home lakes." They then make their way down the Fraser into the Pacific. It is easy to pass Hell's Gate when swimming downstream, but difficult until now to get back "home," three years later, full-grown, when they have to run the gauntlet of the fishermen lying in wait, who net them by the hundreds of thousands. Those which pass into the Fraser River stop eating when they reach fresh water—their "motive power" is the natural oil in their sleek bodies. They pass Hell's Gate and continue on to a lake or stream, the exact spot where they were spawned. If they cannot reach their parent stream waters, the spawn is a failure, and four years later none of their offspring come back from the Pacific.

For canning there are several species, the Sockeye being the best known. Each of the species has many branches in its genealogical tree. Each branch has also its own habitat, and goes straight from the open sea to its own particular spawning ground.

An Indian girl dealing with the salmon as they come along on the factory's "cleaning line."

An Indian workman loading a retort with cans of salmon.

Electronic Cookers

The Radarange, an electronic cooker about the size of a 5-foot refrigerator, has been demonstrated by its manufacturers, The Raytheon Manufacturing Company, U.S.A. Foods which would normally take minutes or even hours to cook are ready for the table within a few seconds. Some slight differences were noted in the cooking process—gingerbread had no crust, onions remained crisp and white—but taste proved them all to be thoroughly cooked.

The cooker, based on the wartime developed magnetron tube, is to go into production within two or three months. Manufacture, however, will be limited to commercial models although a domestic type is scheduled.—*Reuter's Trade Service.*

News from the Ministries

Shell Eggs from Poland

Resumption of imports of shell eggs from Poland commenced in November as the result of an agreement just concluded between the Ministry of Food and the Polish Government through their co-operative export organisation known as "Spelem." The quantity involved is small, some two and a half million eggs, due to the approach of winter, but it is possible that this deal may lead to very substantial imports of shell eggs from Poland in 1947. With the money obtained for these eggs the Poles have purchased barrelled herrings from this country.

"Toffee Apples" and "Chocolate Apples"

In future fresh apples coated with toffee or chocolate shall not be regarded as sugar confectionery, and therefore the purchase of "toffee apples" or "chocolate apples" will no longer require the surrender of personal points.

Manufacturers of these products must, however, now be licensed under the Manufactured and Prepacked Foods (Control) Order (S.R. & O. 1942 No. 1863). Applications for licences, which will only be granted to persons or firms who were manufacturing toffee- or chocolate-coated apples during the year ended June 30, 1939, should be made without delay to the Miscellaneous Food Products Division of the Ministry of Food, 39, Portman Square, London, W.1.

Egg Products

An Order has been made revoking the Egg Production (Control and Maximum Prices) Order, 1943, as amended, and re-enacting in consolidated form the provisions of that Order with some drafting alterations and the following changes of substance.

Frozen Egg (including Frozen Whole Egg, Frozen Yolk, and Frozen White of Egg), whether imported or home-produced, is now included within the definition of Egg Products, and becomes subject to this Order, which is intended to be the main controlling Order for all Egg Products and Frozen Egg. The Imported Frozen Egg (Maximum Prices) Order, 1943 (S.R. & O. 1943 No. 1314), is revoked and the Food (Restriction on Dealings) Order (S.R. & O. 1943 No. 1769) is amended so as no longer to apply to Frozen Eggs.

Existing licences under the Egg Products (Control and Maximum Prices) Order, 1943, continue in force as though granted under the present Order, and those issued in respect of Egg Products for distribution to bakers and manufacturers will also apply to Frozen Egg.

A new schedule of maximum prices for Frozen Egg is prescribed with slightly increased margins. There are also higher maximum prices on a sale to a baker or manufacturer, *i.e.* 1s. 1½d. per lb. for Frozen Whole Egg and Frozen White of Egg and 1s. 4½d. per lb. for Frozen Yolk of Egg.

The maximum prices of Dried Albumen are increased to 6s. 9d. per lb. on a sale to a baker or manufacturer, existing margins remaining unaltered. The maximum prices of other Egg Products remain unchanged.

The new Order, entitled the Egg Products (Control and Maximum Prices) Order, 1946, came into force on November 2, 1946.

Oysters

Arrangements have been made for the importation of 510 tons of oysters—255 tons from Holland and 255 tons from France. This is equivalent to about 6½ million oysters. The trade will start immediately.

The Dutch Oyster Importers' Group, London, has been granted a licence to import the supplies from Holland and has undertaken to allocate a fair share to pre-war importers of Dutch oysters who are not members of the Group. Any pre-war importer of Dutch oysters who is not a member of the Group and desires to participate in the present import should write to the Secretary, The Dutch Oyster Importers' Group, Imperial House, Pudding Lane, London, E.C.3, and furnish full particulars of his pre-war performance.

Prospective importers of French oysters should make application for an import licence to the Board of Trade, Import Licensing Department, 179-189, Regent Street, London, W.1.

Meat from Denmark

Arrangements have been made to enable supplies of carcase meat and offal to be imported from Denmark into this country. This step has been taken in view of the need to obtain larger supplies of imported meat than would otherwise be possible.

It is expected that within the next few months about 10,000 tons of Danish carcase meat will be supplied to this country over and above the deliveries which will be made to the B.A.O.R.

It is anticipated that further substantial quantities of carcase meat will become available from time to time.

Fish and Fish Products

An Open General Licence has been granted for the import of Fish and Fish Products packed in any tin, jar, or other airtight container consigned from any country and imported into the United Kingdom between the inclusive dates November 4, 1946, to October 31, 1947, not including the following types:

Brisling	Pilchards
Crab	Salmon
Crawfish (Crayfish)	Sardines
Herring	Sild
Lobster	Tuna or Tunny
Mackerel	

As a consequence separate licences, other than for the excepted types, will not be required during the above period.

Allocation of Spices

The International Emergency Food Council, acting on a recommendation approved by its Committee on Cocoa and Spices at a meeting in London on October 11, 1946, has decided to discontinue allocation recommendations on Indian pepper.

The result of this decision is that no spices now remain under international allocation.

Wheat and Millable Dredge Corn

In addition to the extra 1d. per cwt. added to the price of millable wheat during the months November, 1946, to July, 1947, inclusive, it has also been decided to add 1d. per cwt. to the maximum prices of non-millable wheat and of millable dredge corn (other than barley dredge corn) during the same period. The minimum price of millable dredge corn will, however, not be increased.

Amendments to the Wheat (Control and Prices) and the Dredge Corn (Control and Prices) Orders, to bring the above increases into force on November 1, 1946, have been made. The Feeding Stuffs (Maximum Prices) Order is also being amended to bring the price of processed wheat into line with the increased maximum price for non-millable wheat.

Christmas Cakes

The following arrangements have been made to enable bakers to produce iced and ornamented cakes for Christmas.

Increased allowances of ingredients will be made as follows:

(1) Allocations of dried egg for the eight-week period beginning November 2, 1946, will be increased from 75 per cent. to 87½ per cent. of datum usage. The whole of the additional quantity will, however, be distributed during the first month. 20 per cent. of the allocation for this period will be in the form of frozen egg, 20 per cent. in the form of sugar dried egg, and 60 per cent. in the form of spray dried egg.

(2) Allocations of sugar for the eight-week period commencing December 8 will be increased by one-seventh of the present rate of allocation. Manufacturers who so desire will be able as usual to draw these supplies about two weeks in advance of the beginning of the allocation period.

During the four weeks from December 8 to January 4 inclusive there will be higher maximum prices for Christmas cakes with a finished weight of not less than 1 lb. of edible ingredients and covered on top, or on the top and sides, with sugar icing or chocolate or almond marzipan, and further decorated. Such cakes may be sold at a price not exceeding four times the cost of the edible ingredients, to which may be added the net cost to the manufacturer of inedible ornaments or decorations added to the cake, subject to a maximum ceiling price for the finished cake of 3s. 6d. per lb.

The necessary amendment to the Flour Confectionery (Control and Maximum Prices) Order will be made as soon as possible.

While the Ministry are confident that bakers will do their best to ensure the maximum output of iced and decorated Christmas cakes, it is recognised that the supply will be strictly limited by the shortage of ingredients and that it will not be possible this year for the trade to meet the full requirements of the public.

Egg Agreement with Eire

An agreement has been reached with the Eire Government for the purchase of the whole of their exportable surplus of eggs in 1947. The price to be paid will depend on the quantity shipped, according to a sliding scale.

Provided that shipments in 1947 reach a specified minimum of approximately 700,000 boxes, the agreement will be extended to cover 1948 and 1949. Under such an extension for 1948, the United Kingdom would undertake to pay the same price as in 1947, and the Eire Government would undertake to ship at least the minimum quantity specified for 1947.

For 1949, the United Kingdom would guarantee a minimum price for a quantity equal to the average of the shipments in 1947 and 1948, the actual price to be negotiated in 1948.

Crystallised Fruits

An Open General Licence has been granted by the Board of Trade for the import of the following crystallised fruits, flowers, etc.:

Glacé and crystallised fruits other than drained (*glacé*) cherries;
Glacé, crystallised, and drained angelica;
Crystallised flowers;
Marrons glacés;

consigned from any country and imported into the United Kingdom between the inclusive dates October 31 to December 31, 1946. As a consequence, individual licences to import these goods will not be required during the above period.

Chocolate, Sugar, and Cocoa

An Order amending the Chocolate, Sugar Confectionery and Cocoa Products (Control and Maximum Prices) Order, 1944, has been made so as to increase the price of cocoa butter and, in the case of chocolate and chocolate confectionery only, to define the types of medicated product which are exempt from the provisions of the Order.

Owing to a rise in the price of cocoa beans, the maximum price of cocoa butter is increased from 1s. 5½d. to 1s. 7d. per lb., delivered by the seller to the buyer's premises, from October 13, 1946.

From January 1, 1947, the exemption from the provisions of the Order given to chocolate and chocolate confectionery containing "a therapeutic dose of a medicament" is abolished. Instead, exemption is given to products in compressed tablet form containing a specified minimum amount of three drugs—phenolphthalein, santonin, or calomel—and also to a number of named products set out in a table. The exemption given to products which comply with certain recognised medical formulae or are prescribed for particular persons by registered medical practitioners is not however affected by the amending Order.

Imports of Fresh Fruit and Vegetables

ARRANGEMENTS FOR 1947

The Ministry of Food announces that in agreement with the Ministry of Agriculture and Fisheries it proposes to ask the Board of Trade to grant an Open General Licence with effect as from November 1, 1946, for the import of fresh fruit and vegetables (not including quick-frozen, dried, preserved and dehydrated fruit and vegetables, dates, herbs, nuts, seeds, grain and dried pulses). As far as possible the arrangements now to be made will continue during 1947, though traders must realise that some changes may be necessary.

The Open General Licence, which will take the place of the existing open general licence for these goods, will be subject to the following limitations:

(i) The following fruit and vegetables will not be permitted to be imported under the Open General Licence: Apples, including cider apples, bananas, grapefruit, lemons, oranges, sweet (other than mandarins, tangerines, and clementines), oranges, bitter, beetroot, carrots (other than new carrots with foliage, packed in containers, not being bags or nets), onions, green, parsnips, potatoes, swedes, turnips (other than new early turnips), brussels sprouts, broccoli, cabbages, cauliflowers, and leeks.

(ii) The following fruit and vegetables will be permitted to be imported under the Open General Licence only between the inclusive dates shown hereunder:

Beans, green: January 1, to May 31. November 1, to December 31.
Carrots (new, with foliage attached, packed in containers other than bags or nets): January 1, to April 30.
Lettuce, endive, batavia, and chicory: January 1, to May 15. November 1, to December 31.
Onions (dry bulb): January 1, to August 15. November 15, to December 31.
Peas, green: January 1, to May 31. November 1, to December 31.
Radishes: January 1, to April 15.
Rhubarb: January 1, to February 28. December 1, to December 31.
Tomatoes: May 1, to July 31.
Turnips (new early): January 1, to April 30. November 1, to December 31.

(iii) Grapes will be permitted to be imported under the Open General Licence only from the Netherlands, France, French Morocco, Algeria, Tunisia, Greece, and Italy.

In addition to the above, the Ministry of Food proposes to arrange with the Board of Trade for licences to be issued to importers to import limited quantities of the following commodities during the periods stated:

Carrots (new, with foliage packed in containers other than bags or nets): May 1, to June 7. (Quantities equal to pre-war quantities in this period.)
Grapes (from countries other than those mentioned above): The whole year.
Potatoes (early): January 1, to April 30.
Tomatoes: November 1, to April 30.

Under certain conditions the Ministry of Food in consultation with the Ministry of Agriculture, will arrange with the Board of Trade to issue licences to importers to import limited quantities of the following commodities:

Brussels sprouts, broccoli, cauliflowers, cabbages, leeks: The whole year.
Lettuce, endive, batavia, and chicory: May 16, to October 31.
Tomatoes: August 1, to October 31.

Glucose for Bakers

As a help to bakers in producing fondant for the Christmas trade, the rate of allocation of glucose to bakers, sundriesmen, and manufacturers of flour confectionery (40 per cent. of datum usage) will be increased by one-seventh for the single eight-week period beginning on December 8. Permits for that period will be made out accordingly and no special application is necessary.

National Flour for Bread Making

The admixture of imported flour which was temporarily discontinued when the extraction rate was reduced from 90 per cent. to 85 per cent. has now been resumed. Flour for delivery in England and Wales will have an admixture of 10 per cent. imported flour, and flour for delivery in Scotland will contain 15 per cent imported flour.

No alteration has been made in Northern Ireland, where the rate of admixture remains at 15 per cent.

Prices of Wheat and Dredge Corn

The Wheat (Control and Prices) (Great Britain) Order, 1945, and the Dredge Corn (Control and Prices) (Great Britain) Order, 1945, have been further amended to give effect to the decision to increase by 1d. per cwt. during the months November, 1946, to July, 1947, inclusive, the fixed grower's price for millable wheat and the maximum grower's prices for non-millable wheat and for millable dredge corn (other than barley dredge corn).

Token Imports

Additions to the lists of specified goods, which may be imported from Canada, U.S.A., Belgium, and Switzerland under the token imports scheme have now been made and include: Mustard, olives preserved in salt or brine, canned vegetables (excluding tomatoes and tomato purée) of types not already on the Token Import List, canned lobster, vegetable butter colouring, cheese rennet, ice cream cabinets, and milk churns, cans and pails, and milk strainers.

It should be noted that canned peas (under the general heading of "Canned Vegetables") are included in the points rationing scheme. Importers of canned peas who are not aware of their obligations under the points rationing system should consult the Ministry of Food, Points Rationing Division, Mount Stewart, Colwyn Bay, North Wales.

Information and Advice

Spoilage in Pickles

B.1378. *We should be interested in some details about spoilage in pickles.* (London.)

Spoilage can take place in two ways, (a) as a result of attack by micro-organisms, (b) physical and/or chemical change in the product.

The principal preserving agent in pickles and sauces is acetic acid. Under conditions usually prevailing bacteria will not grow. The dangers are yeasts and moulds, which grow freely at surprisingly high concentrations of acid. In predicting keeping properties, the overall or what might be termed the "gross" acidity of the product is not a true guide. The controlling factor is the amount of acetic acid in relation to the water present, from which it is obvious that the amount of soluble and insoluble solids in a product is of considerable importance. Experience has shown that a reasonable degree of safety from attack by yeasts and moulds can be anticipated if

$$\frac{\text{Overall acetic acid content} \times 10}{(100 \text{ total solids})} \quad \textit{not less than } 3{\cdot}0\%$$

The figure may conveniently be referred to as the "net" acidity. It is, of course, an approximation, not an absolute truth, and in order to allow a margin of safety, some manufacturers work to 3·5 per cent. minimum.

The insoluble solids in pickles and sauces are usually low, so that for practical purposes the figure for total solids in the above approximation can be replaced by soluble solids as shown on the sugar scale of the refractometer.

It will be evident from this that additional powers of resistance to mould growth and fermentation can be conferred in two ways, either by increasing the acetic acid content or by the apparent anomaly of increasing the sugar (*i.e.* soluble solids) content.

Information Supplied

B.1319. *Literature dealing with herbal products, pickles, and potted meat.* (Kent.)

B.1320. *Formula for a first grade mixing for the manufacture of ice cream.* (Lanark.)

B.1321. *Information on the following products:* (1) *custard powder for commercial purposes,* (2) *tomato soup for canning,* (3) *tomato sauce for covering baked beans, vermicelli, etc., for canning. Also literature dealing with these subjects, cordials, and soft drinks.* (Eire.)

B.1322. *Manufacturers of onion peeling machines and airproof bags suitable for packing dehydrated onions.* (Egypt.)

B.1323. *Suppliers of "Viskaps."* (Northumberland.)

B.1324. *Literature on commercial jam making.* (London.)

B.1326. *Information regarding the brining and processing of orange and lemon peels and the manufacture of potato crisps.* (Staffs.)

B.1330. *Information dealing with the brining of onions.* (Yorks.)

B.1333. *Manufacturers of artificial cloth flowers and silver leaves.* (Surrey.)

B.1338. *Details of process for packing vegetables in brine, and of necessary equipment.* (Lanark.)

B.1339. *Manufacturers of fruit and vegetable grading machines.* (Hereford.)

B.1341. *Equipment for the manufacture of pickles, sauces, and jam.* (Glam.)

B.1342. *The manufacture of gravy powder.* (Leics.)

B.1345. *Wholesale suppliers or manufacturers of saccharin.* (Leics.)

B.1347. *Prevention of the formation of mould spores on jelly tablets.* (Eire.)

B.1349. *Suppliers or manufacturers of high quality bone meal.* (Lancs.)

B.1351. *Suppliers of potato powder.* (N. Ireland.)

B.1352. *Manufacturers of machinery suitable for heading and gutting brislings or sardines.* (Eire.)

B.1353. *Suppliers of brushes for fruit pulping machines, and machinery and plant for the manufacture of dry ice.* (Worcs.)

B.1355. *Name and address of owners of new margarine factory at Durban, S. Africa.* (Lancs.)

B.1356. *Details of the processing of oven-baked beans with tomato sauce for packing in glass jars.* (Australia.)

B.1357. *Firm producing plant for the manufacture of 2 oz. brickettes of gravy salt.* (Cheshire.)

B.1359. *Manufacturers of power filter presses.* (Hants.)

B.1361. *Information regarding the manufacture of potato crisps and suppliers of suitable plant.* (Eire.)

B.1362. *Suppliers of jelly crystal manufacturing and packing machines.* (London.)

B.1368. *Suppliers of synthetic and natural drinking straws.* (Northumberland.)

B.1369. *Formulae for the manufacture of fish pastes.* (London.)

B.1373. *Manufacturers of canning machinery to deal with large size cans.* (Yorks.)

B.1377. *Information and literature regarding the manufacture of food beverages.* (Middx.)

B.1386. *Suppliers of cardboard containers and tin drums.* (Glam.)

B.1387. *Machinery for the manufacture of potato crisps.* (Lincoln.)

B.1389. *Manufacturers of machinery for the production of apple juice.* (Hants.)

Recent Patents

These particulars of new patents of interest to readers have been selected from the "Official Journal of Patents," and are published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Specifications Published

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

579,449. Distillation Products, Inc.: Vitamin A products and methods of preparation thereof.
579,492. Opperman, O. R.: Potato harvesting machines.
579,515. Westinghouse Electric International Co.: Vacuum tight seals.
579,525. Collenette, M. N.: Devices for peeling vegetables and fruit.
579,529. Quaker Oats Co.: Packaging of materials.
579,605. Union Cold Storage Co., Ltd., and Aps, J. E.: Preservation of liquid eggs.
579,629. Power and Sons, Ltd., F. A., and Padmore, J. N.: Tying machines for packages and the like.
579,630. Power and Sons, Ltd., F. A., Padmore, J. N., Platt Bros. and Co., Ltd., and Bassindale, I. B.: Automatic tying machines for packages and the like.

Abstracts of Recent Specifications

Improvements in Apparatus for the Sealing of Containers

This invention relates to improvements in the sealing of containers under conditions of reduced pressure of the type in which two chambers are provided into which containers are automatically fed and withdrawn in sequence by a pair of rotary valves.

In a known arrangement of this type containers to be sealed under reduced pressure are passed by a rotary valve into a chamber at a reduced pressure, and from this chamber by a second rotary valve into a low pressure sealing chamber which is at a pressure slightly higher than that in the first chamber.

According to this invention an apparatus is provided in which containers are automatically fed to a chamber at reduced air pressure in sequence by rotary valve means and are prior to sealing then passed automatically in sequence by similar means to a second chamber where they are sealed, which second chamber is maintained at a greater degree of vacuum than said first chamber. Preferably there is provided an apparatus for sealing containers in which a chamber at reduced air pressure is sealed by two automtaic rotary valves, one serving to pass containers in sequence prior to sealing into said chamber and also to pass sealed containers in sequence from said chamber while the other serves to pass containers prior to sealing into a second chamber maintained at further reduced pressure for the sealing thereof in said second chamber and also to pass sealed containers therefrom into said first chamber.

577,571. *John James Victor Armstrong.*

Trade Marks

The list of trade marks of interest to readers has been selected from the "Official Trade Marks Journal" and is published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

SOYLAC.—639,209. Soya flour, and food preparations made therefrom. **Soya Foods, Ltd.**, Boreham Holt, Elstree, County of Hertford; Manufacturers.

LINK.—639,616. Essences for food, and flavourings, none being essential oils; ice cream powder, preparation used in the manufacture of ices, invert sugar, and vinegar. **Cumming, Parsons, Ltd.**, Top Lilley Street Works, St. Mary Street, Queen's Road, Manchester, 9; Manufacturing Chemists.

LUCKY SWEET-HEARTS.—639,678. Boiled sweets (not medicated), and fondants. **Ernest Marshall,** trading as **Copper Kettle Preserves,** Chester Walk, Cheltenham Spa, Gloucestershire; Manufacturer.

TOREADOR.—640,103. Flour. **Josh Appleby and Sons, Ltd.**, 65, Carolina Street, Bootle, Lancashire; Millers.

GOLD DUST. — 640,107. Flour. **Thomas, Gater, Bradfield and Co., Ltd.**, Lloyds Bank Chambers, High Street, Shanklin, Isle of Wight; Millers.

SOLENTIA.—640,109. Flour, and cereals (prepared for food for human consumption). **Thomas, Gater, Bradfield and Co., Ltd.**, Lloyds Bank Chambers, High Street, Shanklin, Isle of Wight; Millers.

CHOKEUR. — 640,456. Chocolates. **Louis Adelin Savel,** 55, Avenue George V, Paris, France; Manufacturer.

BLACK BOY.—640,572. Tea and coffee. **Morris and Jones, Ltd.**, 82/6, Whitechapel, Liverpool; Wholesale Grocers and Provision Merchants.

FLAVOSEC.—641,987. Non-alcoholic flavouring essences (not being essential oils) for use as ingredients in food. **J. Lyons and Co., Ltd.**, Cadby Hall, Hammersmith Road, London, W. 14; Manufacturers and Merchants.

New Companies

A. R. Askew, Limited. (414608.) Hervey Street, Lowestoft. To carry on bus. of manufacturers of and dealers in milk, cream, condensed and dried milk, etc. Nom. cap.: £5,000 in £1 shares. Permt. dirs.: A. Jenner, 8, Longland Road, Eastbourne; C. A. W. Jenner, 34, Selby Street, Lowestoft.

Golden Crunch (Sales), Limited. (415132.) To carry on bus. of manufacturers of and dealers in biscuits, bread, flour, cakes, etc. Nom. cap.: £25,000 in 5s. shares. Dirs.: W. P. Webster, 127, Kenton Road, Newcastle-on-Tyne; J. B. Cross, "Ribblesdale", Meadowfield Road, Stocksfield.

Reading Rusk Company, Limited. (415165.) 26, Eastcheap, E.C.3. To carry on bus. of manufacturers of and dealers in bread, rusks, etc. Nom. cap.: £10,000 in £1 shares. Dirs.: J. J. Holt (permt.) and Mrs. E. B. Holt, 4, Dovedale Avenue, Kenton.

Ambrosie and Figliolini, Limited. (415192.) 47, Blackett Street, Newcastle-on-Tyne, 1. To carry on bus. of manufacturers of and dealers in ice cream, confectionery, etc. Nom. cap.: £2,000 in 4,000 ord. shares of 5s. and 1,000 non-cum. red. pref. shares of £1 each. Dirs.: R. D'Ambrosie, 188, Sunderland Road, South Shields; A. O. Figliolini, 15, Chopwell Road, Blackhall Mill, nr. Newcastle-on-Tyne.

Lancaster Food Products, Limited. (415589.) 196, Lancaster Road, W.11. Nom. cap.: £1,000 in £1 shares. Dirs.: D. Morris, 71, St. Marks Road, W.10; Mrs. B. Grodsky, 196, Lancaster Road, W. 11.

Taken from the Daily Register, compiled by Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C. 2.

FOOD MANUFACTURE

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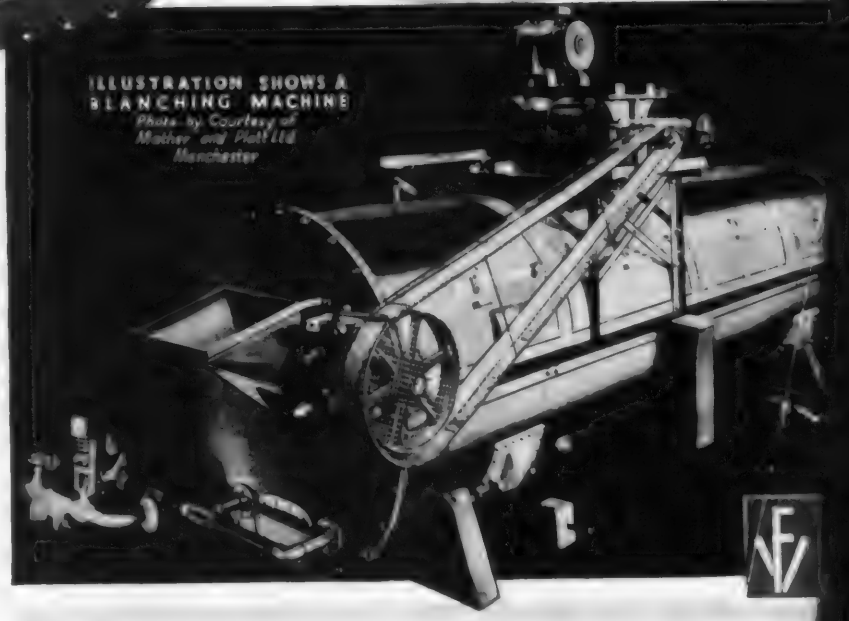

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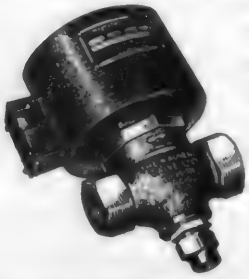

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5 cwt. Fordson Van
10 cwt. Fordson Van
2 ton Thames Van (118" W/B)
2 ton Thames Truck (118" W/B)
3 ton Thames Truck (118" W/B)
4 ton Thames Truck & Tipper (118" W/B)
4 ton Thames Truck (143½" W/B)
5 ton Thames Truck and Tipper (118" W/B)
5 ton Thames Truck (143½" W/B)
Thames 118" W/B Chassis Cab designed for 8 ton Articulated Trailers.

All Thames Vehicles are forward control.

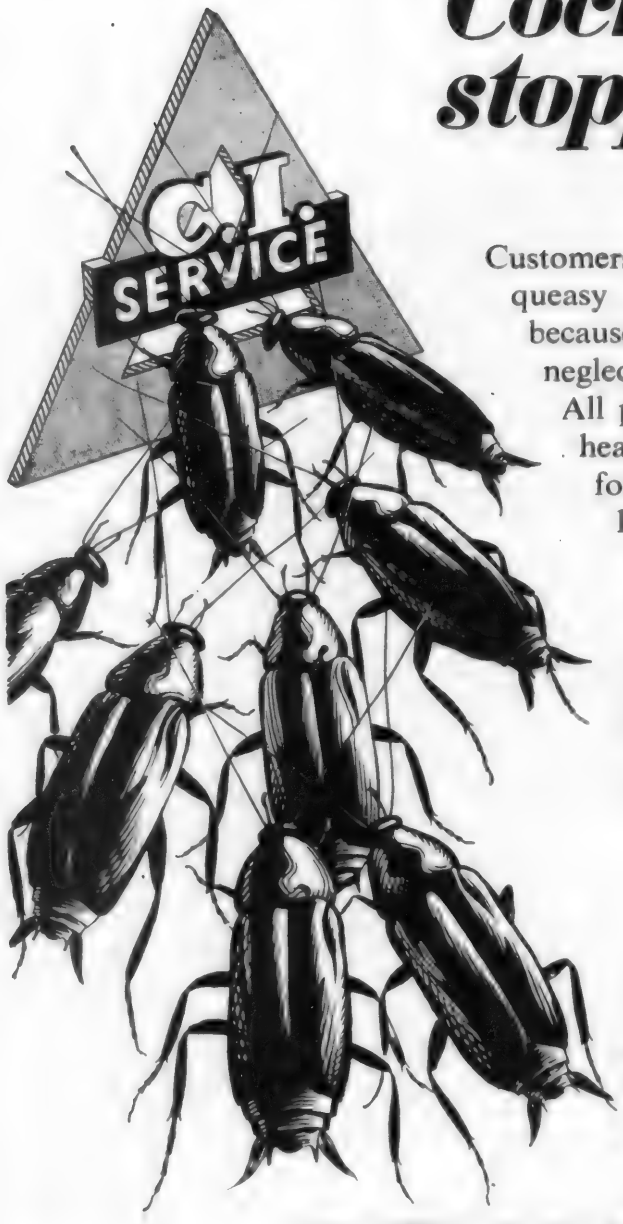
Fordson *Trucks*

-always on the job

THAMES FORWARD CONTROL MODELS

FORD MOTOR COMPANY LIMITED, DAGENHAM

FT 1-6



Cockroaches stopped in their tracks!

Customers are revolted . . . staffs get queasy . . . goodwill suffers . . . all because the first signs of cockroaches were neglected . . . a case for the C.I. Service. All premises, particularly when centrally heated, used for large-scale cooking, or for the storage of food or goods, are liable to infestation by cockroaches, beetles, or steam flies. The C.I. Service will promptly exterminate the evil . . . stop further infestation by regular treatment. There are no preparations for sale . . . telephone or write at once and ask a surveyor to call and advise you.

C.I. SERVICE

Destroys Cockroaches • Beetles • Steam Flies • etc.

CHELSEA INSECTICIDES LTD.
125 PALL MALL, LONDON, S.W.1
Telephone - ABBey 7650

HEAD OFFICE: 125 PALL MALL, LONDON, S.W.1

MAIN DEPOTS:

ABERDEEN: 56 Willowbank Rd. Tel.: 4421
BELFAST: 7 Donegall Sq. West. Tel.: 21535
BIRMINGHAM 3: 6 Livery St. Tel.: Cent. 1097
BOURNEMOUTH: 16 Hinton Buildings. Tel.: 1620
BRISTOL 1: 54 Baldwin St. Tel.: 23683
CARDIFF: 16 High St. Tel.: 8724
CARLISLE: 28 Lowther St. Tel.: 1133
DUMFRIES: 12 Gt. King St. Tel.: 496
EDINBURGH: 50 Queen St. Tel.: 22914
EXETER: 170 Sidwell St. Tel.: 56531
GLASGOW C.2: 57 Renfield St. Tel.: Cent. 4694
GUILDFORD: Hazeldene, Pewslake. Tel.: Abinger 287
HANLEY: 160 Lichfield St.
HEREFORD: Bastian Mews, Commercial Sq.
HINTON AMPNER: Nr. Alresford, Hants. Tel.: Bramdean 277
IPSWICH: 5 Neale St. Tel.: 3234
LEEDS 1: 7 Boar Lane. Tel.: 23234
LETCHWORTH: Station Place. Tel.: 576
LIVERPOOL 2: 18 Cook St. Tel.: Central 8922
MANCHESTER 3: 2 St. John St. Tel.: Deansgate 2102
NEWCASTLE-ON-TYNE: 90 Pilgrim St. Tel.: 21848
NORTHAMPTON: Wyngate, Overstone, Nr. Northampton. Tel.: Moulton 3151
NORWICH: 59 Dereham Rd. Tel.: 24427
NOTTINGHAM: New Square, Low Pavement Tel.: 2637
PRESTON: 17 Winckley Sq. Tel.: 5355
READING: 8 Blagrave St. Tel.: 4928
SALISBURY: 35 Catherine St. Tel.: 3638
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B.36.

FOR BEER CONDITIONING

For many years we have been large makers of Tanks of all descriptions.

"Lithcote" Linings, for which we are the sole licensees, have been proved by many brewers as entirely satisfactory for all types of Brewery Vessels, and with the partial release of materials we are now in a position to manufacture and supply a limited number of Tanks complete with fittings and lined with "Lithcote."

Your enquiries will receive our most careful attention.

Please ask for a copy of our new Brochure. All enquiries in the United Kingdom and Ireland to :

NEWTON CHAMBERS & CO. LTD.
THORNCLIFFE IRONWORKS
Nr. SHEFFIELD

"LITHCOTE"
AN
"ENSECOTE"
PRODUCT

NEWTON CHAMBERS & Co. Ltd., THORNCLIFFE, Nr. SHEFFIELD
LONDON OFFICE: GRAND BUILDINGS, TRAFALGAR SQ., LONDON, W.C.2.

Purity...first Priority

EDIBLE GELATINES

Purity ensured by laboratory control at every stage of manufacture

Available in sheet, kibbled, coarse and fine powders, these Gelatines are the outcome of 50 years manufacturing experience. Though supplies are still limited every effort will be made to meet the individual requirements of our customers.

RICHARD HODGSON & SONS
LTD.
GELATINE WORKS
BEVERLEY · YORKS
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There is a better way of reaching decisions

The discriminating manufacturer leaves nothing to chance. His process is the most efficient he can devise and is controlled throughout to ensure the uniformity of his finished product.

If he is using chemicals for technical purposes he insists on buying from a manufacturer upon whose resources and integrity he can rely. There must be no chances taken or his own reputation will in the long run be in jeopardy.

If you are not already using M & B fine chemicals we invite your enquiries and our Technical Service Department will be glad to help you solve any chemical problems you may have.

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Manufacturers of Fine Chemicals Since 1834

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T.C. 4004

sorry to keep asking

BUT WE MUST HAVE THOSE CONTAINERS BACK, PLEASE!

Every container that gets lost or mislaid means a delay in deliveries to somebody—and it might be you! So please don't hoard or give away your boxes and fibreboard containers—put them away in a safe, dry place until the C.R.S. van comes and calls for them. In that way you'll help to cut down delays in deliveries to a minimum, and bring the day nearer when there will be plenty of containers to spare!

MAY WE REMIND YOU ALSO... **1.** Open C.R.S. wood and fibreboard cases carefully, to avoid damaging tops and sides. **2.** Store them out of the weather until collection. **3.** Fold C.R.S. collapsible cartons FLAT—with flaps sticking OUT (otherwise flaps have to be untucked before re-use). **4.** Vans collect during normal deliveries. C.R.S. vans provide additional collections at regular intervals. Cash paid on spot.

CONTAINER RECOVERY SERVICE

S.P.D. Limited

UNILEVER HOUSE, BLACKFRIARS, LONDON, E.C.4

Telephone: Central 7474 Telegrams: Spedeco, Telex, London

★ Authorised Collectors of empty containers for Margarine, Compound Cooking Fat, Lard, National Household Milk (M.O.F.), and for many leading Food, Soap, Toilet and Household Product Manufacturers.

CRS 30-146 *Container Recovery Service does NOT operate in N. Ireland, Isle of Man and Channel Islands*

Amino-acids mean nothing to him . . .

but . . . all he knew was that he wanted more ! Of course, we know that it was "PROTEX" that made all the difference to the flavour . . . and made it twice as appetising. "PROTEX" is a highly-concentrated protein extract containing all the important amino-acids so valuable for nourishment. It enhances the natural flavour of any food, making it more palatable and digestible. May we tell you more about it ?

PROTEX

Sole Manufacturers: FREDK. BOEHM LTD., 19, Bentinck Street, London, W.1

SATINEX

A pure Burnt Sugar Caramel which is manufactured especially to meet the requirements of the Bakery and Confectionery Trades.

Satinex can be used for the colouring of biscuits, cakes, chocolate rolls, mincemeats, puddings, liquorice sweetmeats, toffees and all types of foodstuffs.

Satinex imparts a delightfully rich and appetising appearance, thus enhancing the SALES value of the goods in which it is used.

C. E. CARAMEL is of high colouring power, and has the flavour which tends to give the Essence the true Roasted Coffee Beans taste of genuine coffee.

VEGETEX for imparting an appetising colour to soups, gravies, sauces, puddings and cakes, and for all requirements in the kitchen and bakehouse.

Further particulars gladly sent on request.

L. LAMBERT & CO. LTD.

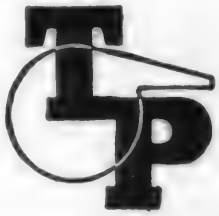
HIGH ST., UXBRIDGE, MIDDLESEX

London Office: 4, Percy St., London, W.1 *Telephone:* MUSeum 6102

LAMBERTS *for Caramel*

Pioneer Specialists in Caramel & Primings for over Sixty Years

NEWEST DEVELOPMENTS IN DETERGENCY TECHNIQUE



The extreme importance of perfect cleanliness in food-making and food-packing plants is provoking wide interest in

TEEPOL X

This modern detergent, instantly soluble in hard or soft water, chemically neutral and effective under acid or alkaline conditions, gives better cleansing in less time and often at less cost.

•

We shall be happy to send full details of TEEPOL X and its applications in the food industry or to send a representative to discuss your particular problems. NOTE TO PRESENT USERS: There is an acute shortage of the wooden barrels in which TEEPOL X is packed. It will aid us greatly in maintaining prompt deliveries if all empty barrels are returned without delay.

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NEW ADDRESS: 112 STRAND, LONDON, W.C.2. • TELEPHONE: TEMPLE BAR 4455

MANCHESTER OFFICE: 4 ST. MARY'S PARSONAGE, MANCHESTER 3. BLACKFRIARS 0097

RATIN destroys the enemy within

It is vital to the success of post-war reconstruction that the Ratin Service should be enlisted to wage war against the enemies within — the rats which are ravaging our towns and countryside, destroying food reserves and other essential stocks. They *must* be defeated.

The surveyors and operators of the Ratin Service are highly skilled. Their method of destruction of rats and mice is based on scientific and well-tested principles.

The service is nation-wide and includes provision for careful inspection and treatment at regulated intervals to guard against re-infestation where the menace has once been brought under control. Write at once and ask a surveyor to call and advise you.

The Company's preparations are not supplied for use by the general public.

RATIN SERVICE

THE BRITISH RATIN CO. LTD.

125 PALL MALL, LONDON, S.W.1

Telephone: ABBey 7621

BRANCH OFFICES:

ABERDEEN: 36 Willowbank Road. Tel. 4421.
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BIRMINGHAM 3: 6 Livery St. Tel. Central 1097.
BOURNEMOUTH: 16 Hinton Buildings. Tel. 1620.
BRISTOL 1: 54 Baldwin St. Tel. 23683.
CARDIFF: 16 High St. Tel. 8724.
CARLISLE: 28 Lowther St. Tel. 1133.
DUMFRIES: 12 Great King Street. Tel. 496.
EDINBURGH: 50 Queen St. Tel. 22914.
EXETER: 170 Sidwell St. Tel. 56531.
GLASGOW C.2: 37 Renfield St. Tel. Central 4694.
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HANLEY: 160 Lichfield Street.
HEREFORD: Bastion Mews, Commercial Square.
HINTON AMPNER: Nr. Alresford, Hants. Tel. Bramdean 277.
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LEEDS 1: 7 Boar Lane. Tel. 23234.
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LIVERPOOL 2: 18 Cook St. Tel. Central 8922.
MANCHESTER 3: 2 St. John St. Tel. Deansgate 2102.
NEWCASTLE-on-TYNE: 90 Pilgrim Street. Tel. 21848.
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NORWICH: 59 Dereham Road. Tel. 24427.
NOTTINGHAM: New Square, Low Pavement. Tel. 2637.
PRESTON: 17 Winckley Sq. Tel. 5355.
READING: 8 Blagrave St. Tel. 4928.
SALISBURY: 35 Catherine St. Tel. 3658.
SHEFFIELD 1: The White Building, Fitzalan Square. Tel. 23555.

F.M.

BRONZE VALVES

The Blakeborough bronze valve series provides a very full choice of types for all regular conditions and requirements. High class bronzes only are used—we do not specialise in the lower grade varieties. Acid resisting alloys (phosphor, zinc-free, etc.) may be specified where conditions call for their use. The accompanying table gives an outline of the standard seat-and-stopper types, although a wide variety of other patterns and classes of valve are available—"Y" valves, marine types, extra heavy patterns, wedge valves, parallel slide valves, swing check valves, piston-sleeve valves, gland and plug cocks, foot valves, etc.—which it is impossible to itemise here. Flanged or screwed connections should be understood in each case. Other details, material specifications and prices on application.

CLASS OF VALVE	SCREW	STEAM W.P.	SEATING	PATTERNS
CHECK	—	250 lbs. 500°F.	screwed-in renewable ring	Globe, junction, vertical
STOP AND CHECK	Inside	250 lbs. sat.	screwed-in renewable ring	Globe, junction
STOP AND CHECK	Outside	250 lbs. 500°F.	screwed-in renewable ring	Globe, junction
STOP (high-efficiency)	Outside	250 lbs. 500°F.	special	Globe, junction
STOP (standard)	Inside	250 lbs. sat.	screwed-in renewable ring	Globe, junction
STOP (standard)	Outside	250 lbs. 500°F.	screwed-in renewable ring	Globe, junction
STOP (needle stopper)	Inside	250 lbs. sat.	screwed-in renewable ring	Globe, junction
STOP (needle stopper)	Outside	250 lbs. 500°F.	screwed-in renewable ring	Globe, junction
CHECK	—	150 lbs. sat.	renewable comp. disc	Globe, junction
STOP AND CHECK	Inside	150 lbs. sat.	renewable comp. disc	Globe, junction
STOP	Inside	150 lbs. sat.	renewable comp. disc	Globe, junction
SPRING RELIEF	—	250 lbs. 500°F.	screwed-in renewable ring	Globe, junction, open disch.

BLAKEBOROUGH VALVES

J. BLAKEBOROUGH & SONS LTD. · BRIGHOUSE · ENGLAND

Electricity and peace-time production

Electricity, which was the ***mainpower*** behind the ARMING of the nation, played a vital part in FEEDING the nation.

With the cessation of hostilities the need for food for ourselves and Europe has increased, and the greater adaptability and vast motive power of electricity will enable it to meet and supply all new demands.

Consult your Electricity Supply undertaking when making your own peace-time plans or write to the British Electrical Development Association and thus obtain unbiased advice on all matters relating to electrical applications.

BRITISH ELECTRICAL DEVELOPMENT ASSOCIATION, 2 SAVOY HILL, LONDON, W.C.2

EDA

'EDICOL' COLOURS

are now being produced in a MORE CONCENTRATED FORM possessing a HIGHER DEGREE OF SOLUBILITY.

The high standard of purity laid down for the Edicol Colours has been fully maintained.

D.27

ICI

Information from I.C.I. Sales Offices.

IMPERIAL CHEMICAL INDUSTRIES LIMITED, NOBEL HOUSE, LONDON, S.W.1

'Cushion' Stitching—patented.

are your packing problems sewn up?

For complete protection use Sealdsacs—the mouth is first sewn with the patented 'Cushion Stitch,' then sealed with a tape. Nothing can get out nor in.

A special system does this quicker than you can close a sack by hand.

We have other ideas, too, that answer every sort of sack-pack problem. . . .

the best way to pack is always a MEDWAY *multi-wall sack*

WE MAKE EVERY SORT OF VALVE OR OPEN SACK

MEDWAY PAPER SACKS LTD., LARKFIELD, NR. MAIDSTONE, KENT

Seal with **POPPE** *security and satisfaction.*

RUBBER RINGS

GUARANTEED QUALITIES CONFORMING WITH FOOD AND DRUGS ACTS, for Phoenix, Automatic and Flat Caps, Sealing Compounds and Gummi Rings, Rubber Moulds for Fondants, etc. Every description of Rubber Goods for the Food Trade.

THE POPPE RUBBER & TYRE Co., LTD

TRADE MARK

TEL: POPESGROVE 2271 · GRAMS: POPPE TWICKENHAM

TWICKENHAM · MIDDLESEX

PERFECT picturization of the most intricate colour combinations with only FOUR printings is something every experienced buyer will want to investigate. And that's just what LITHESK offers . . . even where six, seven, ten printings have been used previously.

The LITHESK special processes—with precision presses, conditioned papers, tested inks and varnishes—combine to make every LITHESK label a masterpiece in register, in colour tone, in quality of printing, in micro-accurate cutting.

And by reducing the number of printings LITHESK obviously reduces costs substantially. It also cuts them further by the unique LITHESK "Revolving Stock" plan. This plan gives you keener prices by far whether you need 25,000 or 25,000,000 labels—without the necessity to budget for next year's requirements to help this year's price . . . without the advent of a disquietingly large label inventory at stocktaking time through overbuying . . . without the need to do anything except provide for your monthly requirements in freshly printed, highest quality LITHESK labels whose perfection is as big a stimulant to sales as their cost is a relief to your budget.

Canners, Bottlers, Packers of every kind of goods the world over buy literally millions of LITHESK labels every year—they have proved in practice the truth of LITHESK claims. We should like you, too, to put LITHESK claims to the test—whether you are a large or a small user of labels and cartons. We are, of course, still limited by current paper restrictions but we will do our utmost to meet your requirements.

Ask, without obligation, for samples and constructive recommendations.

BROWN & BIBBY LIMITED

SPEKE LIVERPOOL 19
TELEPHONE: HUNTS CROSS 1331

TO SAVE 11,000,000 MAN HOURS EVERY DAY

Unthinkable....

MECHANICAL HANDLING WITHOUT LIGHT METALS

For every *million* tons of manufactures, 5,000,000 to 20,000,000 tons of materials are hauled, handled and stacked inside works. Light Metals speed the movement of this vast tonnage by increasing *payload* at the expense of deadweight. Every type of handling equipment — truck, trolley, tractor or conveyor — provides scope for the designer who visualizes his product in Light Metals and discards the old-fashioned inseparables of weight and strength for the strength and lightness of aluminium alloys. Conveyors are easier to carry — stacking trucks lift more — haulage trucks travel faster — stopping and starting is easier — when Light Metals are used. Light Metals are rustless, non-sparking, fireproof and highly workable — and unlike all other metals, aluminium is plentiful, at about 30% less than the pre-war price. The incorporation of all these advantages into a product is more easily achieved with the advice and assistance of ALMIN LTD.—a technical organisation with wide experience in every aspect of Light Metal fabrication, development and research . . . Ask ALMIN about Light Metals.

SOME FACTS ABOUT LIGHT METALS

Aluminium alloys have the strength of steel but only one-third of the weight. They cut maintenance costs because they cannot rust. Aluminium is abundant and is cheaper than ever before. Strong aluminium alloy sections are available at short notice.

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LIGHT METAL INDUSTRIES

ALMIN LIMITED · FARNHAM ROYAL · BUCKS

WILLCOX

VEE ROPE DRIVES

DESIGNED TO MEET TODAY'S NEED

Smooth and positive running without slip or stretch.

Easily installed and no maintenance needed.

Single Ropes transmit from ¼ to 23 horsepower according to size and speed.

Grooved Pulleys also supplied for drive conversions.

Write now for Prices and Technical Data

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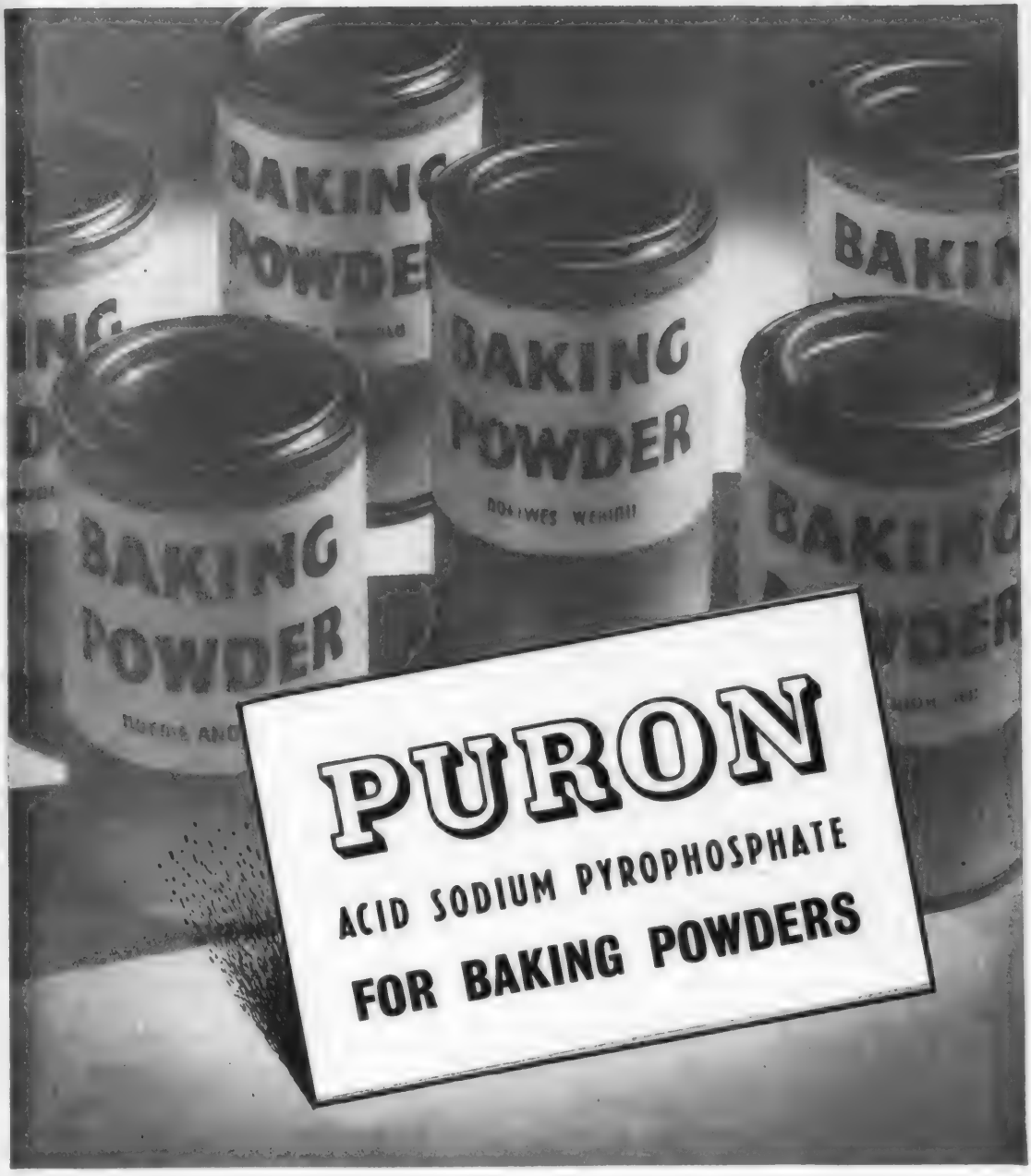

ALBRIGHT & WILSON LTD.

Food Phosphate Manufacturers

49 PARK LANE, LONDON, W.1. WORKS: OLDBURY & WIDNES

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First class travel . . . .

By Airliner for long distance travel

-but your products will travel best by

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BENNETT

COMPLETE PROCESSES for Evaporated Milk, Sweetened and Condensed Milk, Whey Paste and Powder, Malt Extract, Spray Drying for Milk and Whey Powders incorporating the latest scientific and engineering developments. Many repeat orders.

BENNETT SONS & SHEARS LTD.
9/13, GEORGE STREET, MANCHESTER SQUARE, LONDON, W.1
Works: Tyseley, Birmingham · Established 1790 · Telephone: Welbeck 8201/3

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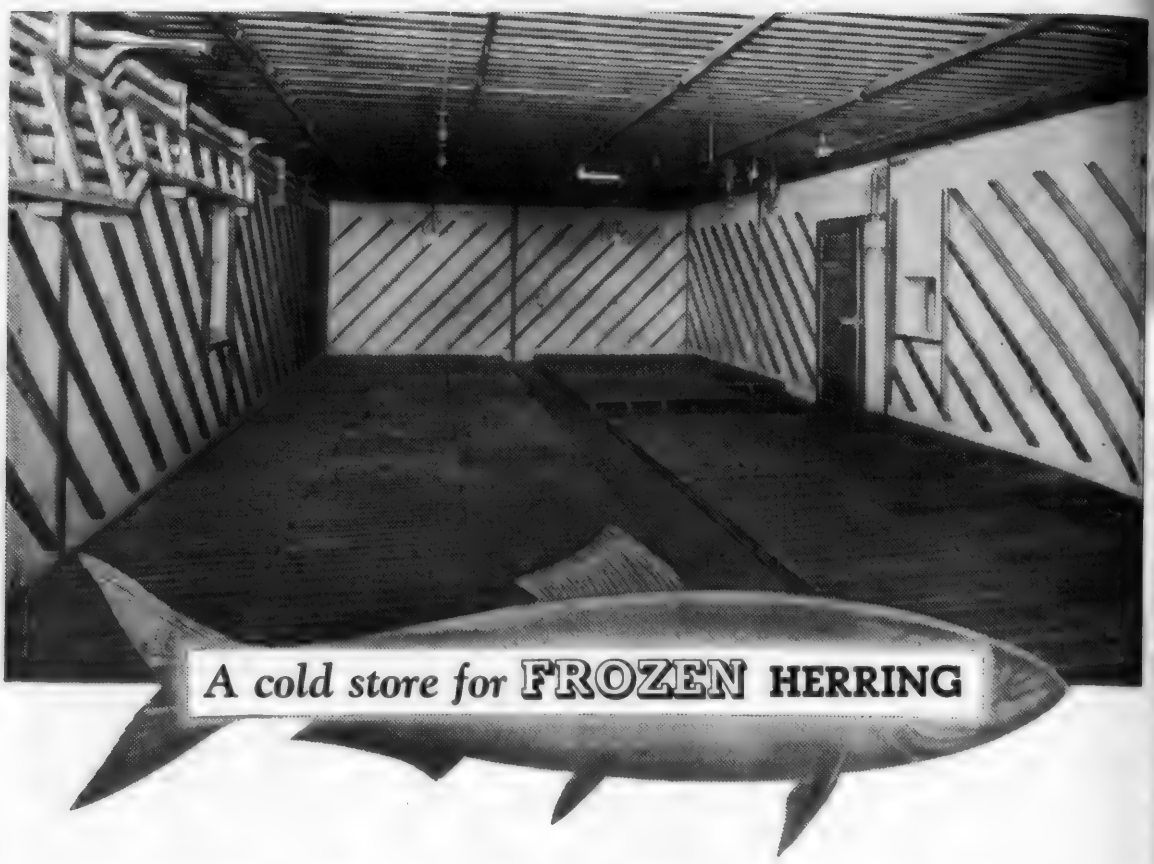


A cold store for FROZEN HERRING

HERE is a new development in modern refrigeration—FROZEN HERRINGS. The success of the process is dependent on the insulation of the cold store room. By permission of Messrs. Birds Eye Foods Limited the interior of their new cold store at Fraserburgh is shown in the illustration. Newalls Insulation Company Ltd. were entrusted with the insulation using their Nonpareil corkboard, the material that has been used for the insulation of every type of cold store on land and on shipboard for nearly half a century.

The insulation is the most important part of every cold store because economic functioning is dependent on the efficacy of the insulating material. Newalls Nonpareil Corkboard cuts down maintenance costs by eliminating unnecessary leakage of 'cold'. Careful erection is essential if the best results are to be obtained, and for this reason Newalls maintain a staff of skilled workmen who can be sent anywhere, enabling Newalls to undertake the erection as well as the supply of their Nonpareil Corkboard.

NEWALLS INSULATION COMPANY LTD

HEAT, COLD AND SOUND INSULATION SPECIALISTS

LONDON · GLASGOW · MANCHESTER · NEWCASTLE UPON TYNE · BIRMINGHAM · BELFAST · BRISTOL · CARDIFF

Dear Father...

DO YOU REMEMBER, father, when as a young man you joined your father's firm, what a time you had with the old boy?

Do you remember your bright ideas and what happened to them?

Do you remember how every new idea of yours was either 'new-fangled nonsense' or a 'pig in a poke,' and how you were always dismissed with the reminder that 'the moon isn't made of green cheese'?

Do you remember how it always infuriated you to be told that what was good enough for *his* father was good enough for *him*?

Well, dear father, perhaps you'll remember these things when I try to tell you what needs doing in our steam plant.

Perhaps you will weigh up these facts and figures which show how much fuel we can save and how much we can improve plant output efficiency by simple changes in our steam trapping methods; by keeping air out of the steam spaces with these little automatic vents; by putting in a Flash Vessel to make use of all this flash steam that's going to waste; by taking up some of these other ideas that are proving to be real winners in using steam to better advantage.

Let's drop a line to these Spirax people for the latest dope. You're game? Right — hand me the scissors for this enquiry slip.

SPIRAX MANUFACTURING CO. LTD.

Phone: Cheltenham 5175 CHELTENHAM, GLOS. Grams: Spirax, Cheltenham

LONDON OFFICE : 28 Victoria Street, S.W.1. Telephone : Abbey 6101

SPIRAX STEAM TRAPPING AND AIR VENTING

SPIRAX SAVE STEAM

To SPIRAX MANUFACTURING CO. LTD., CHELTENHAM, GLOS.

Please tell us how we can

..... Improve our steam trapping and air venting methods.

..... Make good use of flash steam.

..... Improve our steam-using methods generally.

ENQUIRY SLIP

NAME

ADDRESS

"—such stuff as dreams are made on"

At the Panto . . . Orchestra tuning up . . . advertisements on the drop curtain . . . smell of oranges . . . jabber of countless children . . . harlequinade . . . the boy who's a girl, the dame who's a man . . . the trap act . . . the glorious transformation scene. Truly a treasure chest of youth.

Pantomime, it is hoped, will never yield to progress. But the mundane things of life demand constant improvement — new methods, new materials, new conceptions. Aluminium has proved itself a worthy medium for the expression of modern techniques. Light, strong, durable, non-rusting, and good to look on, here is the metal that aids the march of progress. Its contributions to war were of incalculable value; its future development will be no less important. We, at British Aluminium, confine ourselves exclusively to its production from raw material to pure metal and alloys in diverse forms. We KNOW Aluminium and its potentialities; our resources and technical skill are unrivalled, and our Development and Technical Service Sections will co-operate, in the fullest sense, with anybody needing advice or information concerning the use of Aluminium in any form for any trade or industry.

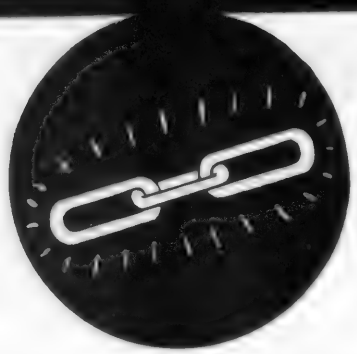
Shape the future with

BRITISH ALUMINIUM

Issued by THE BRITISH ALUMINIUM CO. LTD., SALISBURY HOUSE, LONDON WALL, LONDON, E.C.2.

136-10

ESSENCES!
and
ESSENTIAL OILS,
BUTTER FLAVOURS
ETC...
for all
FOOD PRODUCTS
Barnett & Foster Ltd
NIAGARA WORKS:
EAGLE WHARF RD. LONDON N.1.
Established 1858



THERMAL LINKAGE

CUTS BOTTLE WASHING FUEL COSTS BY 50%

In many plants the heat in spent process liquors which was formerly wasted is now being successfully recovered, thus effecting substantial savings of fuel.

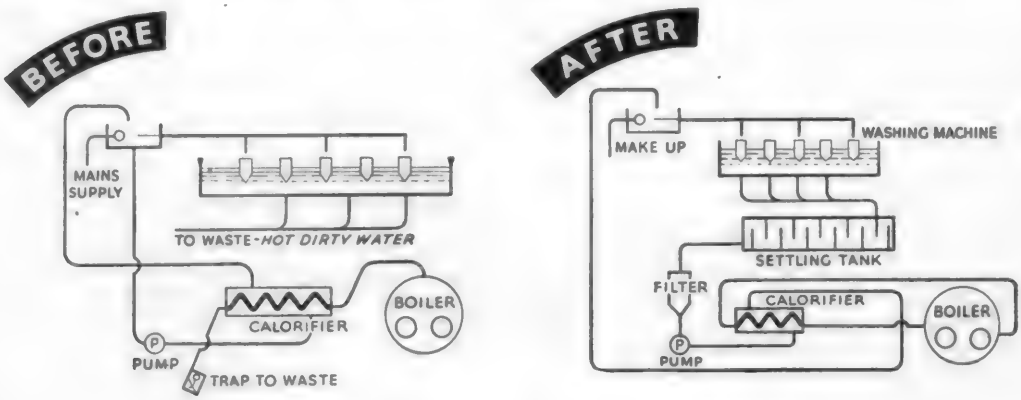
The simplicity of the method of recovering waste heat is shown by the experience of a firm with a bottle-washing plant requiring a supply of water at 140°F.

Originally the hot water was obtained by passing mains water through a calorifier where it was heated by a steam supply. Both the condensate from the steam and the hot dirty water were allowed to run to waste. (See Diagram "Before.")

The first step was to replace the steam supply to the calorifier by a closed circuit hot water supply, thus returning the cooler water to the boiler and reducing considerably the fuel requirements.

Next, filtering arrangements were installed for the water leaving the washing machines. This dirty water was passed through a settling tank and finally a filter, the clean water being pumped back through the calorifier into the tank feeding the washing machines. (See Diagram "After.") The small amount of make-up water required was negligible and it was found possible to maintain a temperature at the calorifier inlet of 100°F.

Results: Fuel requirements reduced by 50%. Water wastage eliminated.



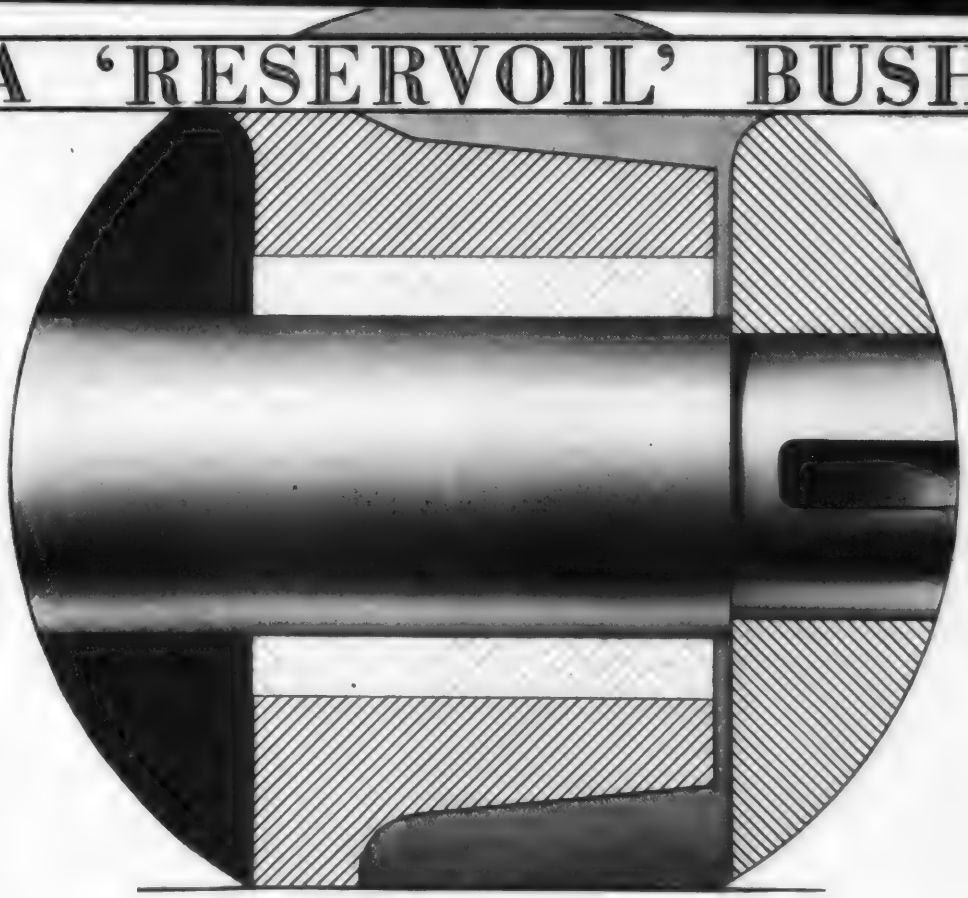
PUT WASTE HEAT TO WORK IN YOUR PLANT

Have you investigated the economies you could effect in your plant by applying the principles of Thermal Linkage? If you are undertaking a reconstruction or plant conversion scheme see that Thermal Linkage is fully considered. In your own interests you should go into the matter now.

Substantial savings may be possible for a relatively trifling capital outlay. For general information see Fuel Efficiency Bulletin No. 21 (The Construction of a Factory Heat Balance). For specific advice consult in your Region the Office of the Ministry of Fuel and Power.

ISSUED BY THE MINISTRY OF FUEL AND POWER.

A 'RESERVOIL' BUSH



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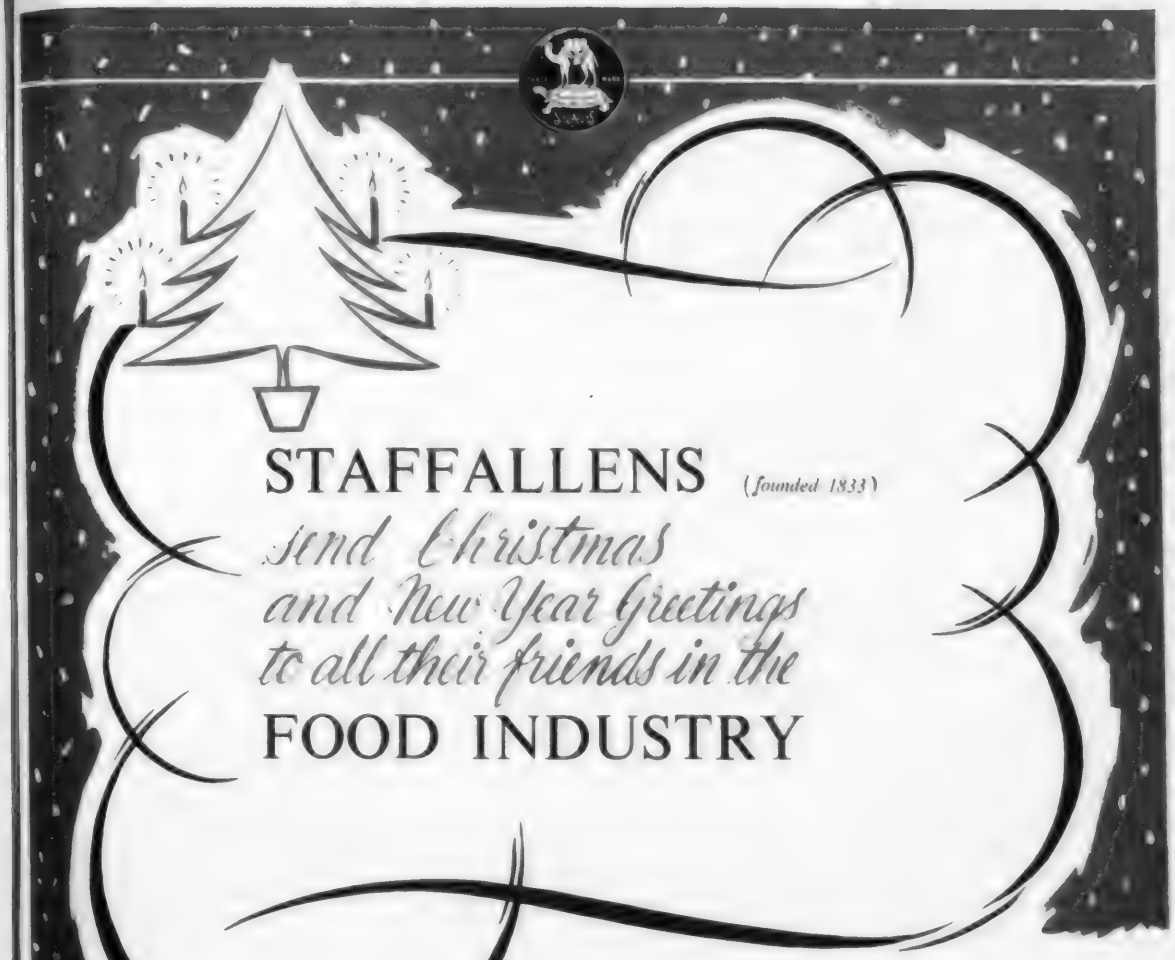

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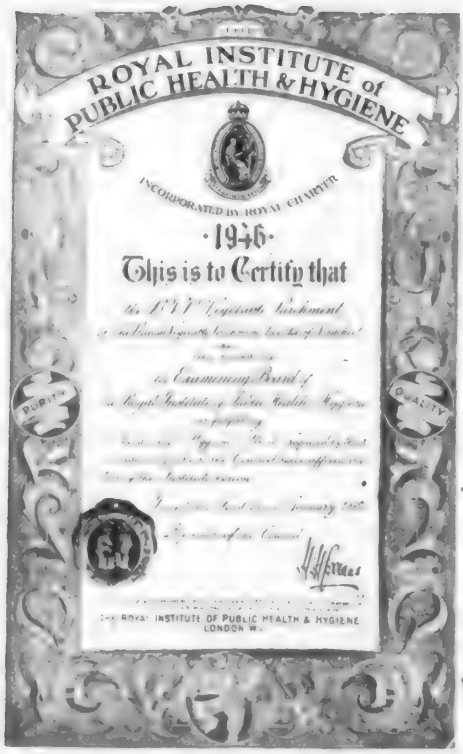

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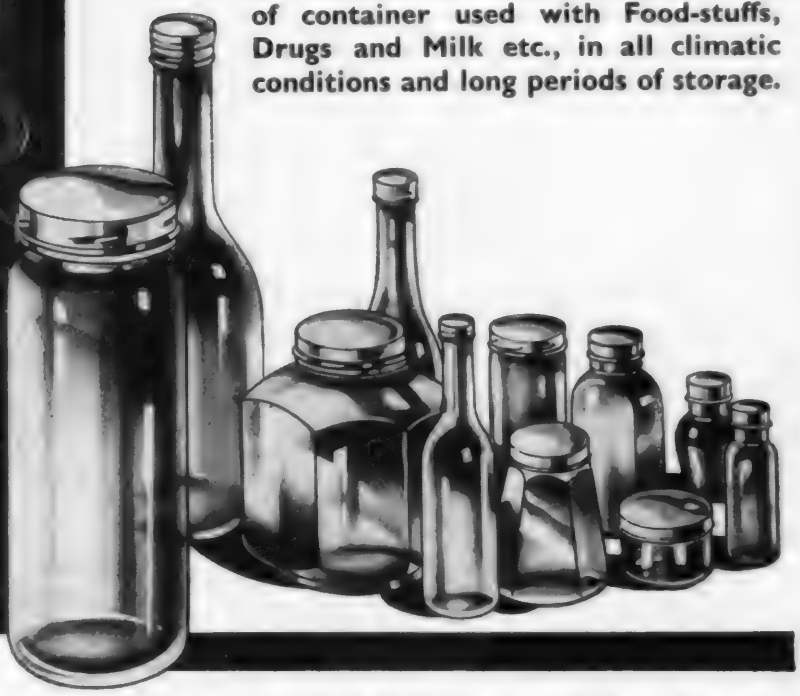

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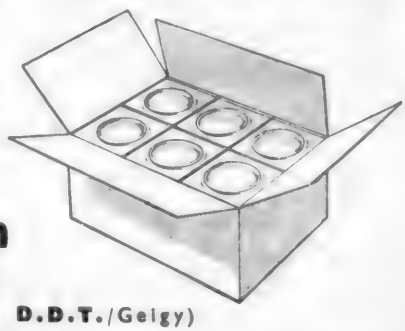

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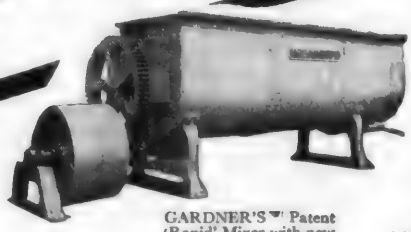

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Section 2. Open to anyone resident in Great Britain (excluding those qualified for Section 1). Entries may take the form of drawings or a descriptive specification of the idea.

Designs are invited for any package relative to commodities generally sold through GROCERS, CHEMISTS, STATIONERS, IRONMONGERS and the MOTOR TRADE. Three prizes will be awarded in each of these sub-sections and, in addition, supplementary prizes in each Trade for specified commodities.

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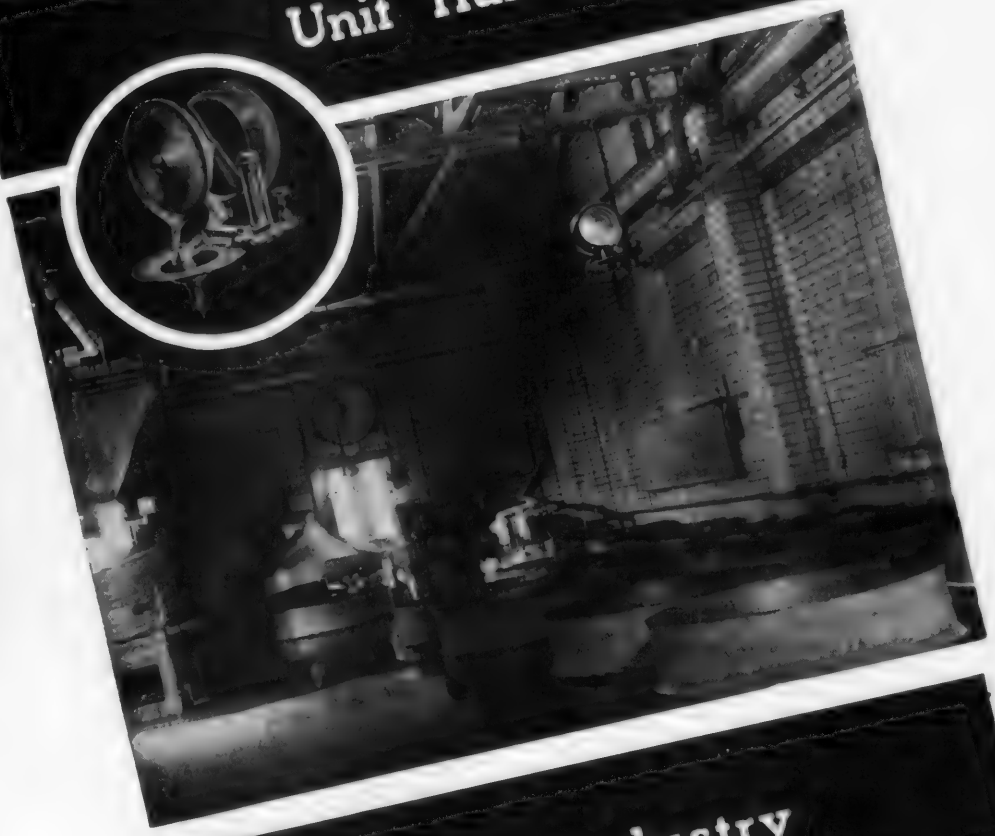
Unit Humidifiers in the Baking Industry



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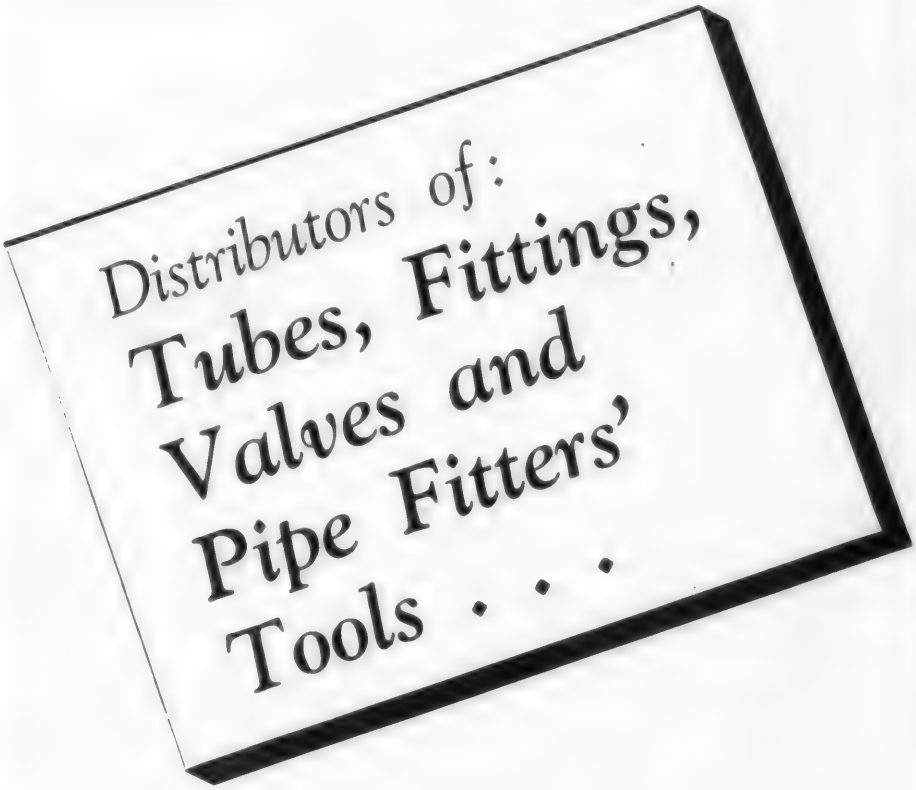

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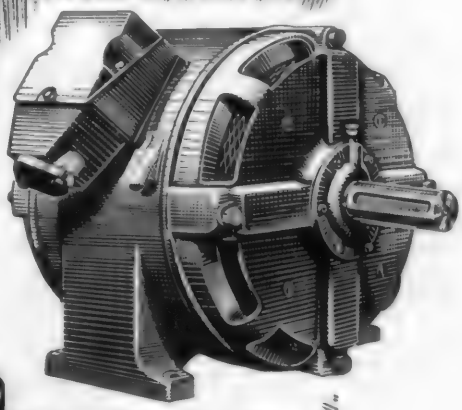
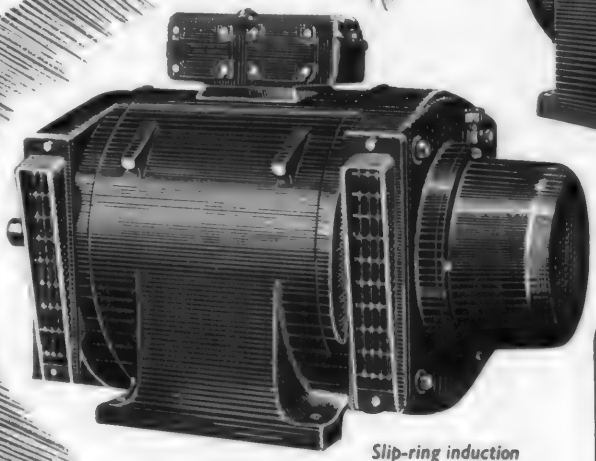


Squirrel-cage induction motor, protected type.



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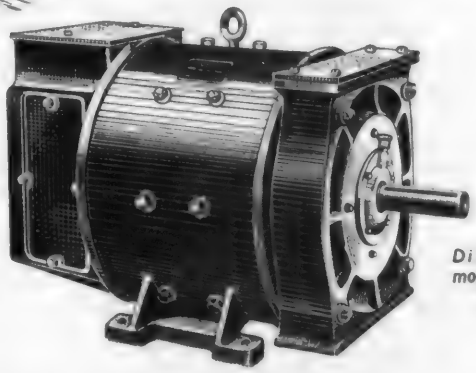

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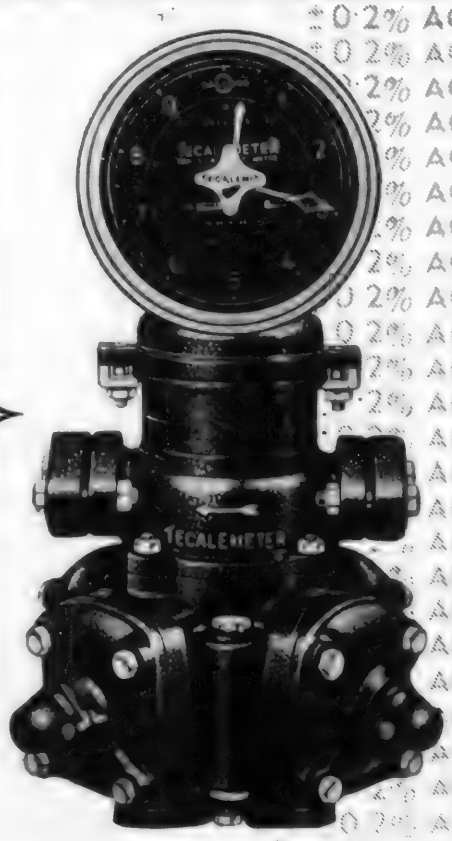

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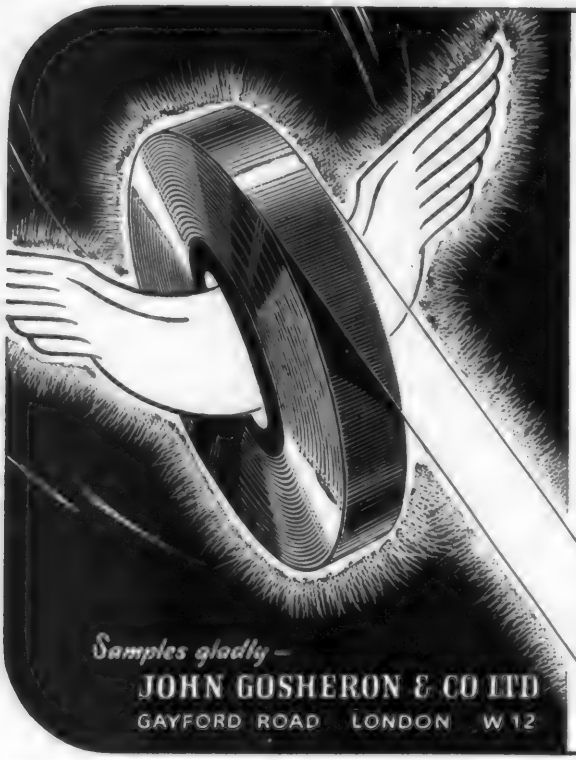

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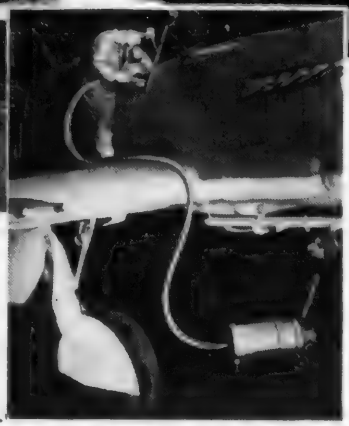

These two illustrations reflect the diverse uses of **B.V.C. Industrial Vacuum Cleaners** today. Your industry may have a problem remote from these two examples, which can also be solved by our experts. Get in touch with B.V.C. Our long experience on these problems is at your service.

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In a recent issue of the American publication "Industrial and Engineering Chemistry" two acknowledged authorities, Mr. W. L. Badger and Mr. R. A. Lindsay, wrote that "The war has accelerated the change TO THE OUTSIDE HEATING ELEMENT, forced circulation design for salting operations, and to the LONG TUBE VERTICAL design for non-salting operations."

Kestners originated the "climbing film" principle which today is acknowledged to be the simplest yet the most efficient method of evaporating liquids in bulk.

There is a Kestner plant to suit all evaporation problems.

Kestners *Chemical Engineers*

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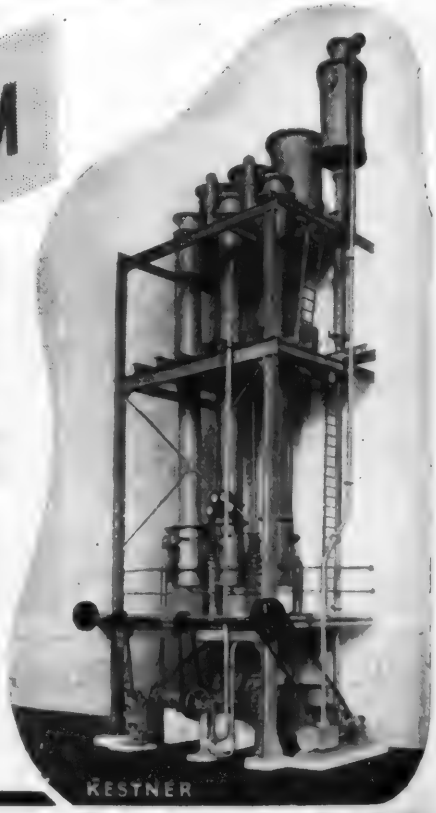
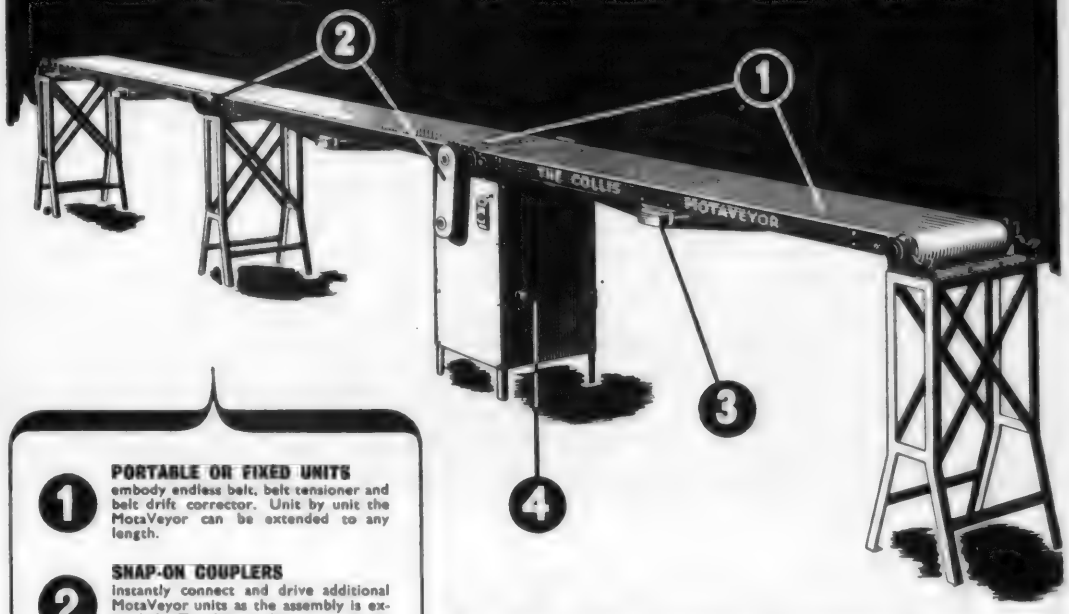


an entirely new U·N·I·T POWER CONVEYOR



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embody endless belt, belt tensioner and belt drift corrector. Unit by unit the MotaVeyor can be extended to any length.

2 SNAP-ON COUPLERS
instantly connect and drive additional MotaVeyor units as the assembly is extended. To change the speed, or to reverse, simply change the coupler.

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Patents applied for

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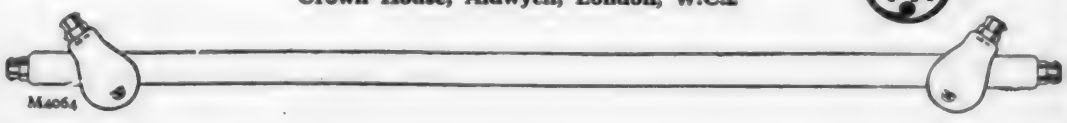
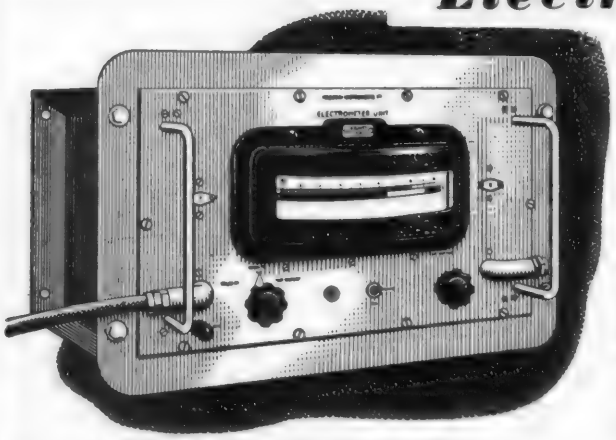


Electronics in overalls



For process control in progressive industrial practice, ELECTRONICS has taken over from the operative. In place of laborious manual tests, continuous-reading instruments automatically indicate chemical changes, at a glance, at any time. In this way the Marconi Indicating Electrometer accurately measures and registers the pH value of aqueous solutions. Skilled labour can be otherwise engaged for pH determination no longer requires constant technical supervision.

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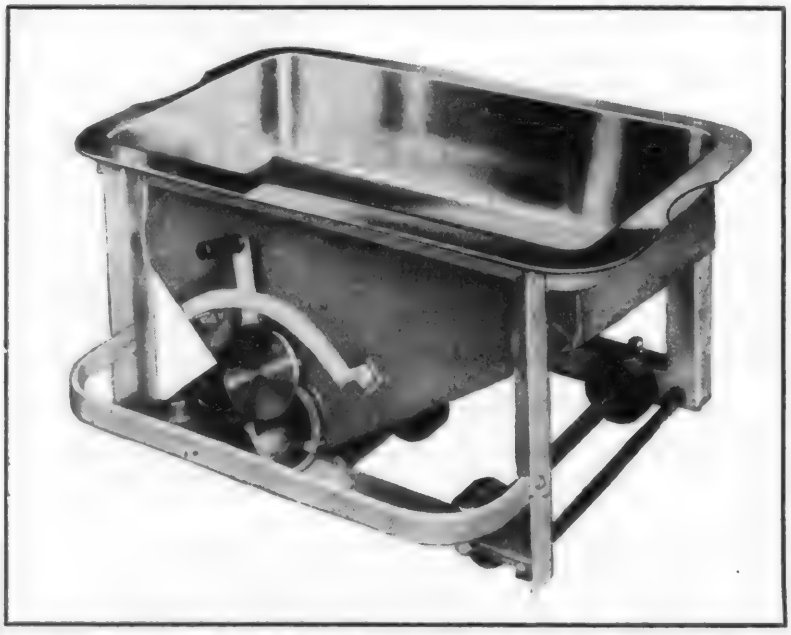

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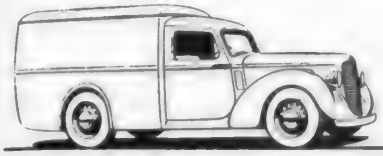
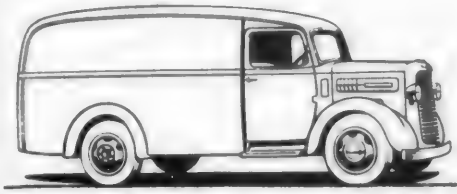


8 CWT. SUPERVAN



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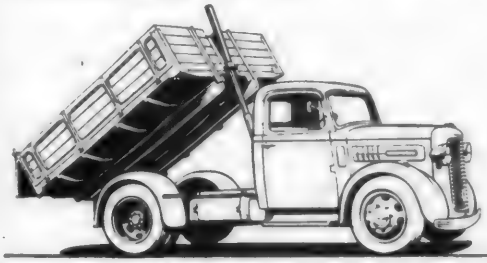
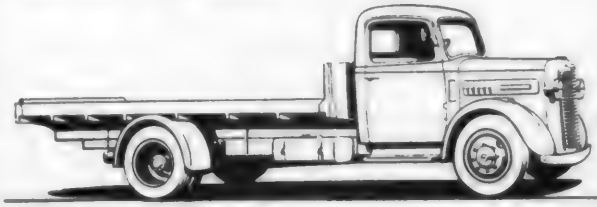
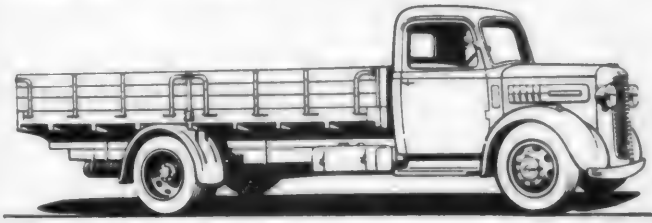
8 carts to 8 tons



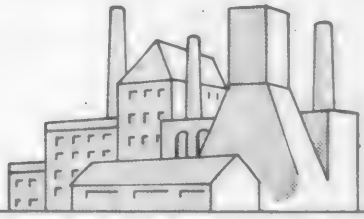
'SUPERPOISE' 2-3 TONNER

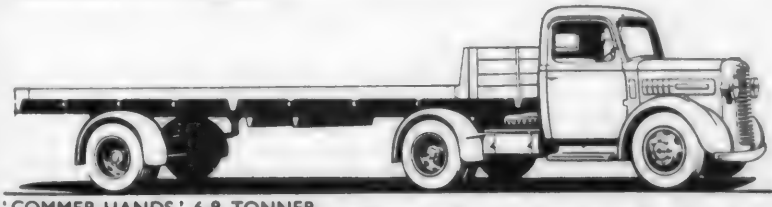


'SUPERPOISE' 3-4 TONNER

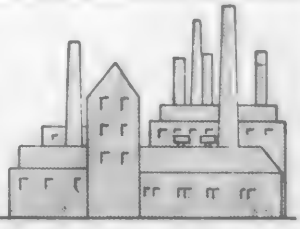


'SUPERPOISE' 4-5 TONNER





'COMMER-HANDS' 6-8 TONNER



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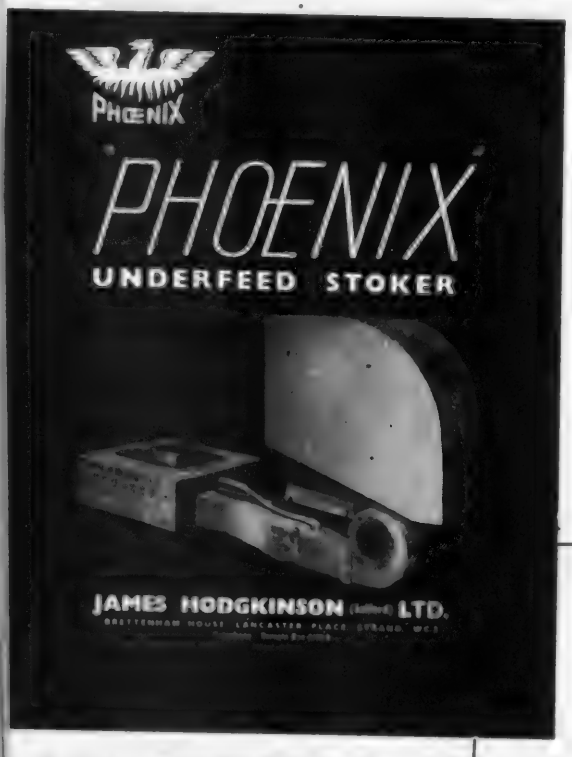

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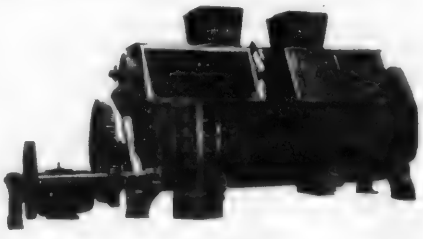

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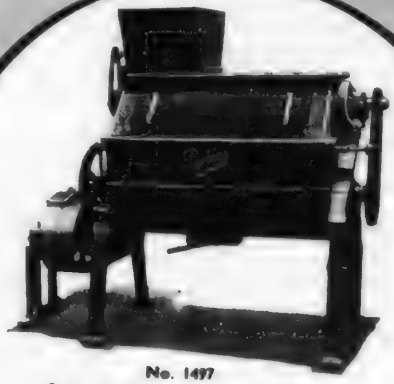

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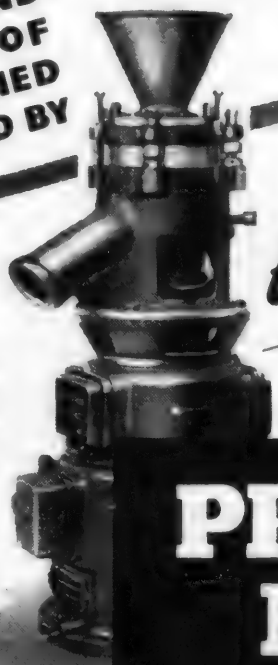

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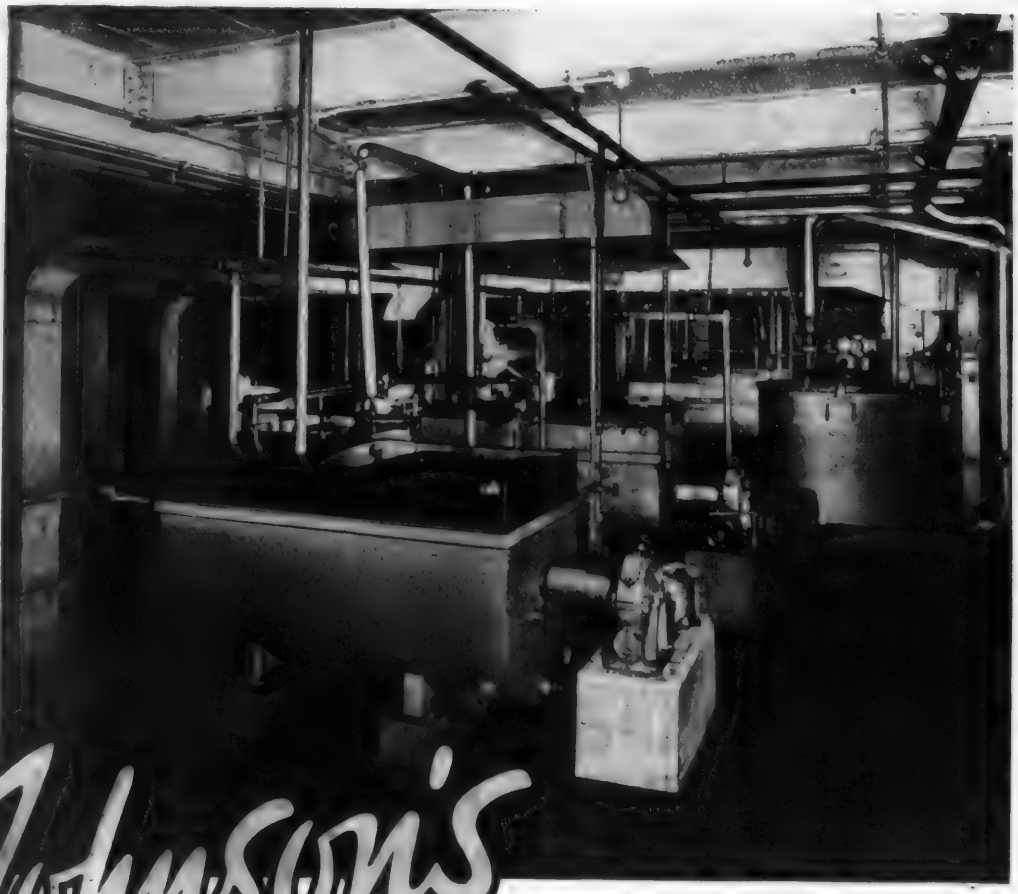

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FOOD MANUFACTURE

Vol. XXI. No. 12 Published Monthly December 1, 1946

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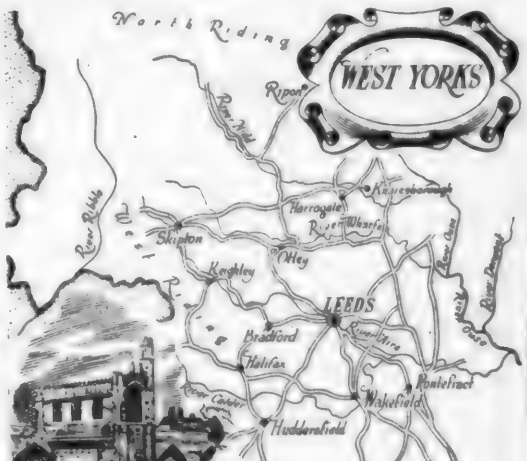
Published by Leonard Hill Limited, 17, Stratford Place, London, W.1. Mayfair (7383.)
Annual Subscription, Home and Overseas, 1 year 20s.; 2 years 30s.; 3 years 40s.

THE Yorkshire dales, whose rivers flow from the watershed of the Pennines towards the plain of York, were the scene of thriving industries in the days of water power. In the age of steam, West Riding industry has been well served by Yorkshire's coalfields. The ironworks of Leeds, the wool and cloth trade of Bradford, Huddersfield and district, the engineering industry of Keighley and Halifax, the coal mines of Wakefield, make it one of the great manufacturing areas of England.

Early in the nineteenth century, these fast growing towns saw the establishment of many local banking firms. The Wakefield and Barnsley Union Bank, the Bradford Old Bank, and Leatham Tew & Company, of Wakefield, have been incorporated, through amalgamations, with that of Barclays Bank Limited, whose branches in this area are controlled through a West Yorkshire Local Board at Leeds.

Under a system of decentralised control, with Local Head Offices established throughout the country, a close association with local affairs and, not infrequently, personal links with past traditions are maintained by



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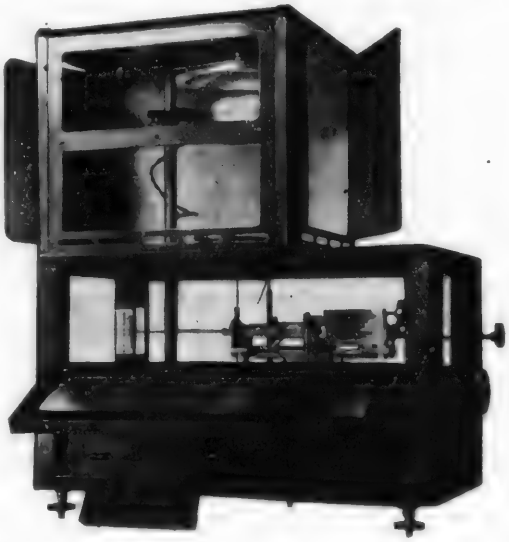

It gives direct readings in percentages on a 5-gram sample in times varying from 2 minutes for certain drugs to 12 minutes for certain flours.

It is in use for leather, clays, plastics, fibres, emulsions, malts, flours, brans, tobaccos, and nearly everything else, and moreover—

DELIVERY IS QUICK

IT IS A DRYING PROCESS, NOT an Electrical Measurement!

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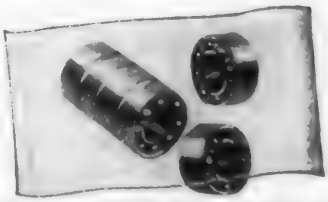
FROM BUTTER TO BALL-BEARINGS

PLIOFILM is the packaging discovery of the century! It combines most of the advantages of all previously known packaging materials plus many exclusive features. In the panel on the right are listed some of its many remarkable properties.

If you consider these, you will realise that Pliofilm is equally effective as a container for liquids or a wrapping for solids—for it seals moisture in, and it seals moisture out. So, whatever class of product you make, from butter to ball-bearings, or from aero-engines to aspirins, Pliofilm will solve your own post-war packaging problems.

As one would expect, Pliofilm has been extensively used in war industries, which have been absorbing the whole output. But the valuable experience thus gained has accumulated for your benefit—to be used as soon as restrictions are relaxed. Meanwhile, we are in a position to advise you on your own specific packaging problems.



***Pliofilm* is: tough and durable. Inherently water proof, moisture and water-vapour proof. Air proof. Oil-and-grease proof. Mould-and-vermin proof. Proof against acids and alkalis. Impervious to normal heat and cold. Odourless and tasteless. Non-contaminating. Non-explosive. Light, flexible, pliable and transparent. Printable. Has dimensional stability throughout the entire humidity range. Can be handled by high-speed packaging machines. Will weld by heat sealing — making a hermetically-sealed joint. Laminates with paper or board — making possible a vacuum-sealed package. There is no fire hazard.**

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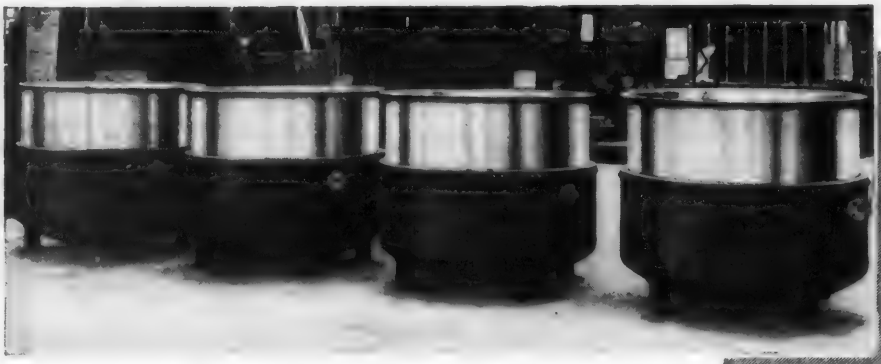
THE BEST THINGS WILL COME PACKED IN

★ (*Pliofilm* — a registered trade mark of THE GOODYEAR TIRE AND RUBBER COMPANY)

Pliofilm —BY GOODYEAR



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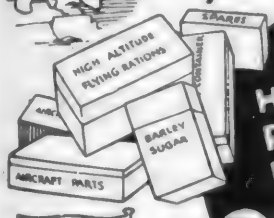
The War has taught us many things about the packaging of foodstuffs for the Forces-in the Tropics, in the Polar Regions, in the Western Hemisphere: on land, on sea, and in the air. This ***Experience + Thirty Years***-trading will enable us to make a practical contribution to the post-war packaging world.



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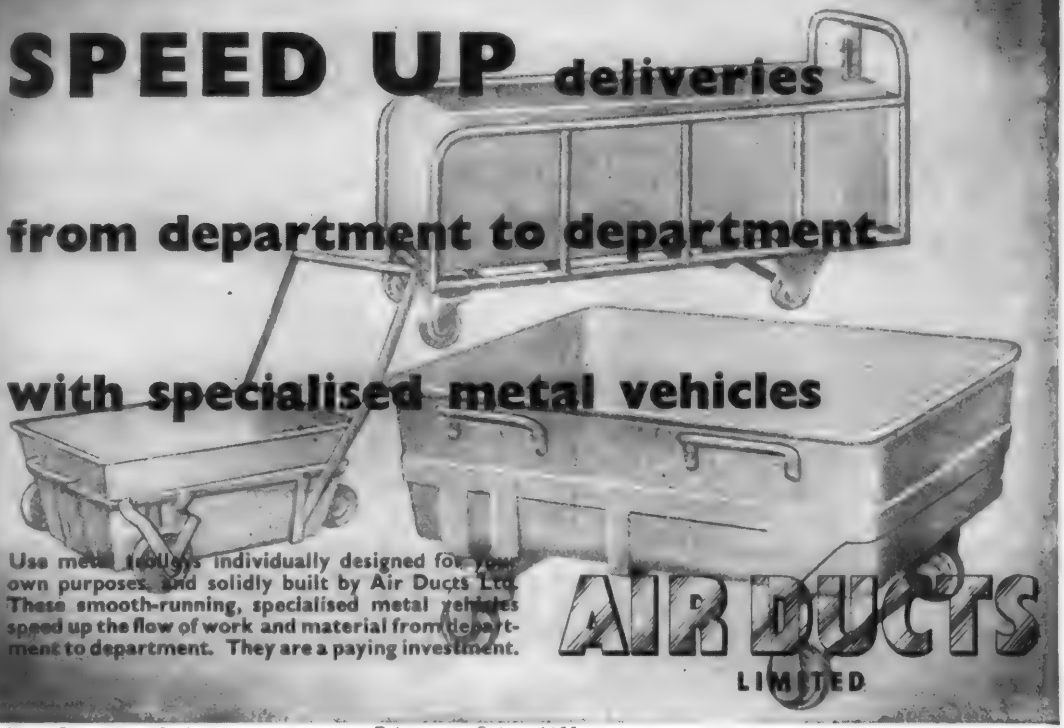

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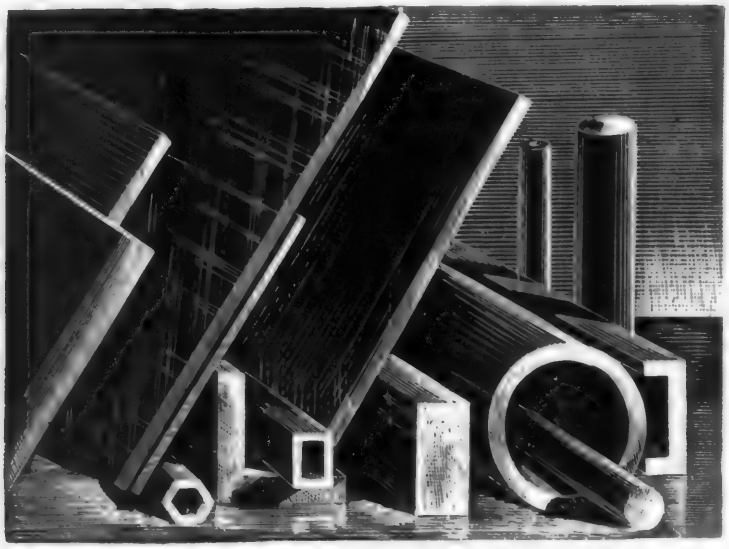
this is TUFNOL
the engineer's material



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These are the ideal way of saving for holidays, Christmas or other special occasions. Clubs are popular, easy to run and need not interfere with your Savings Group.

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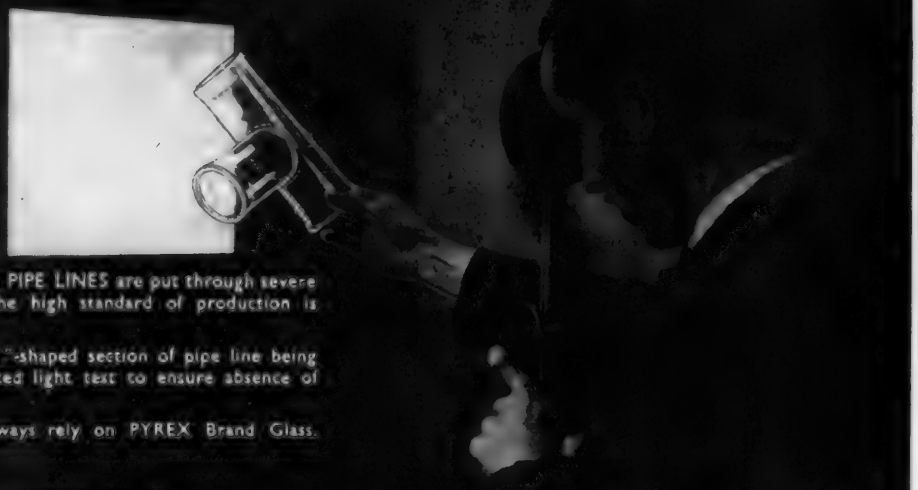

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Our picture shows a "T"-shaped section of pipe line being subjected to the polarized light test to ensure absence of strain.

That's why you can always rely on PYREX Brand Glass.

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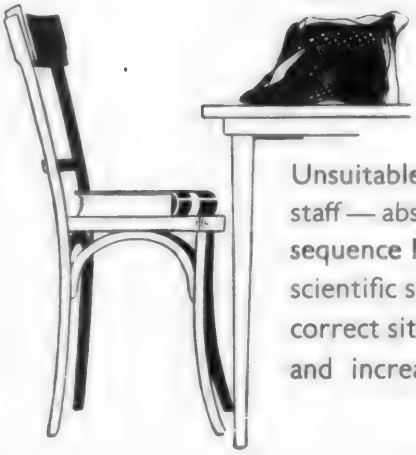

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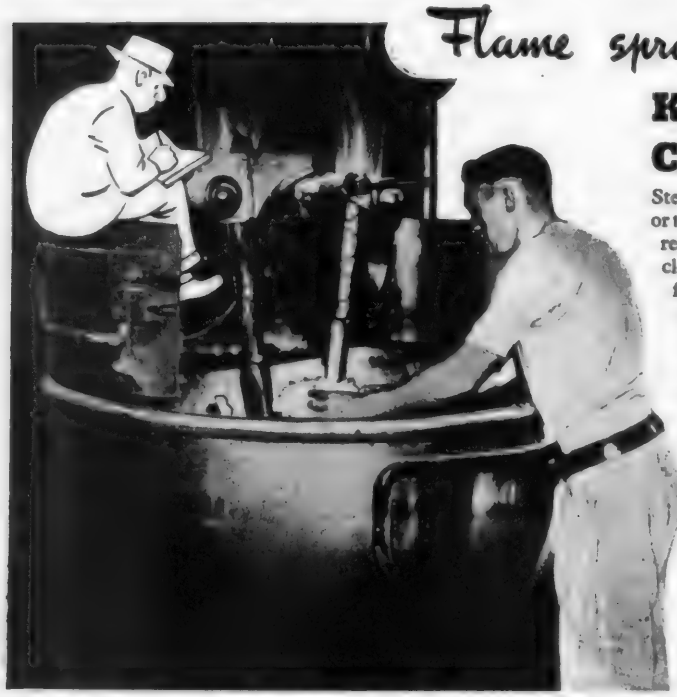

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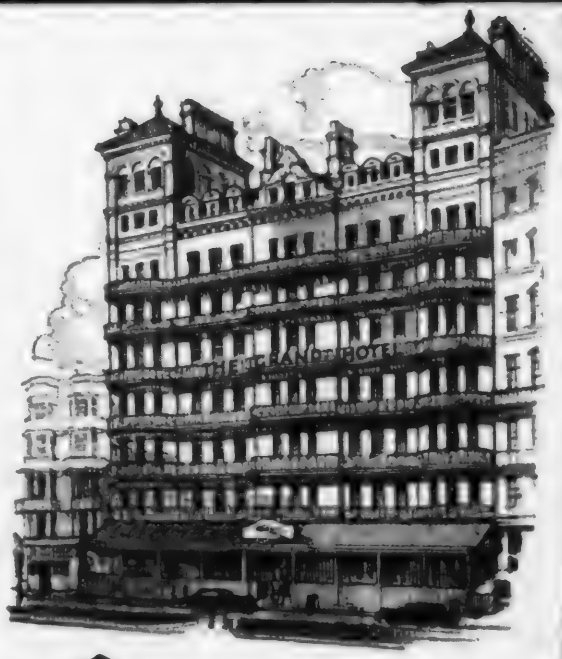

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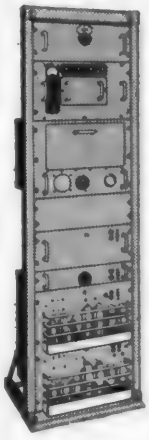

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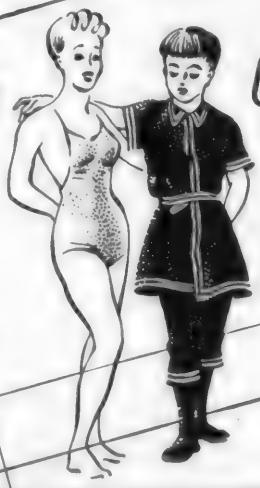

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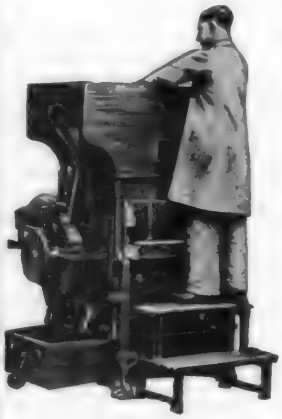
make the cake "fruity" but they must be **CLEAN.**



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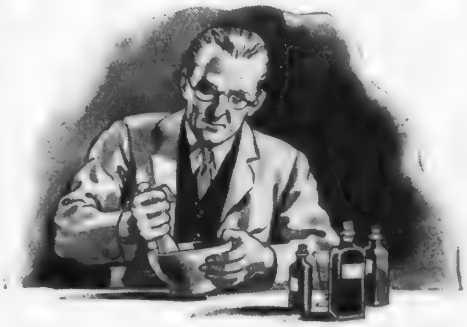

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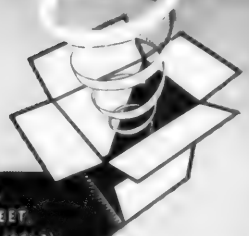

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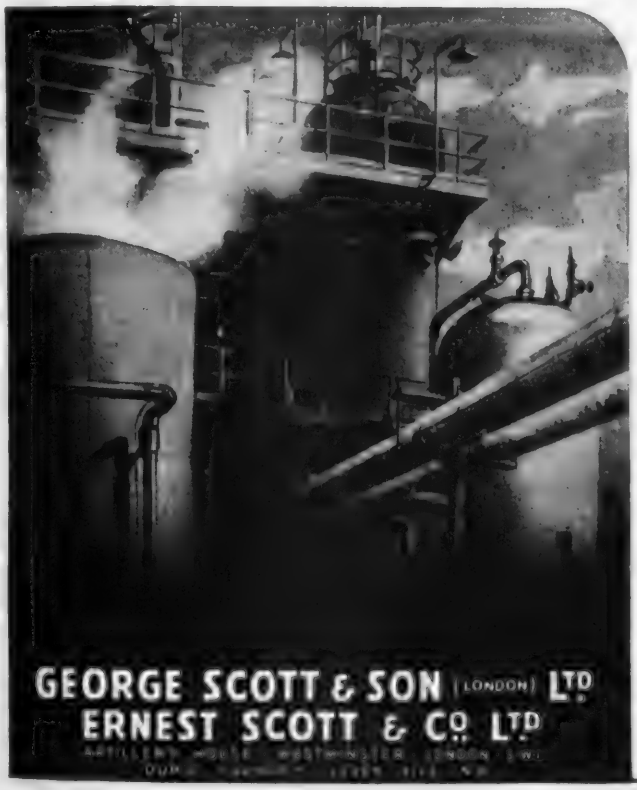

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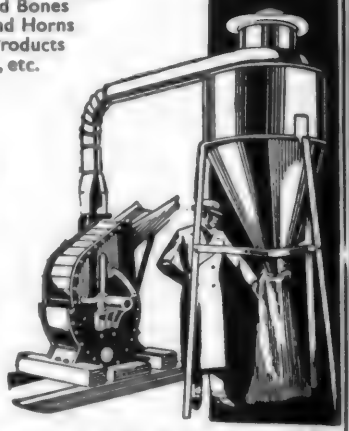

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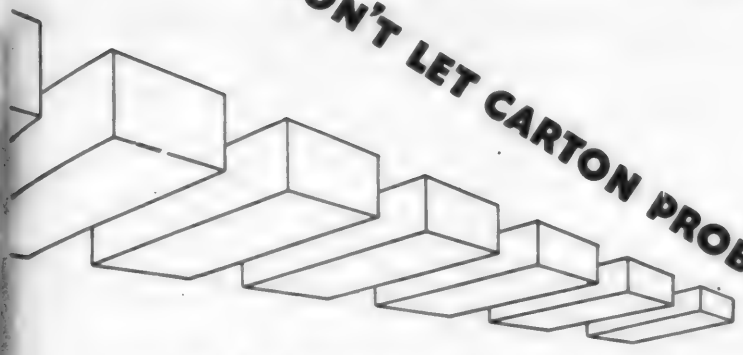

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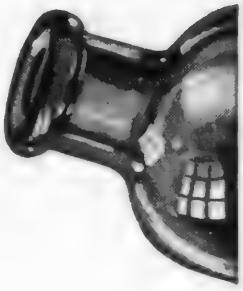

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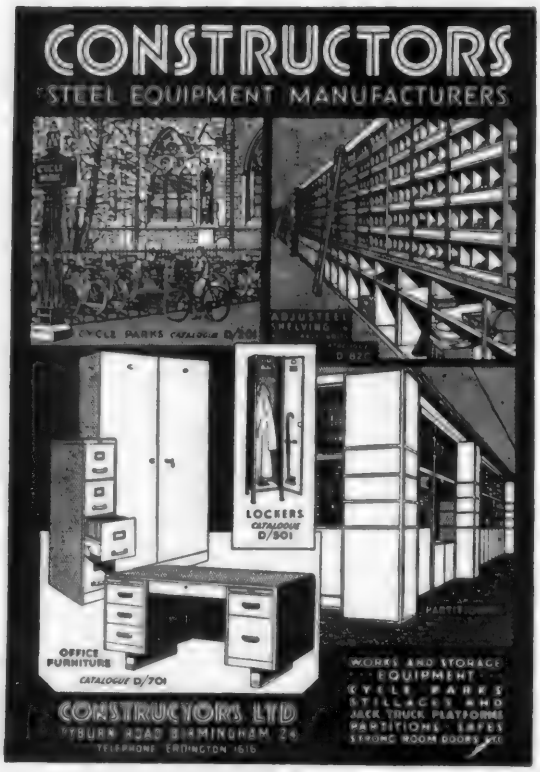

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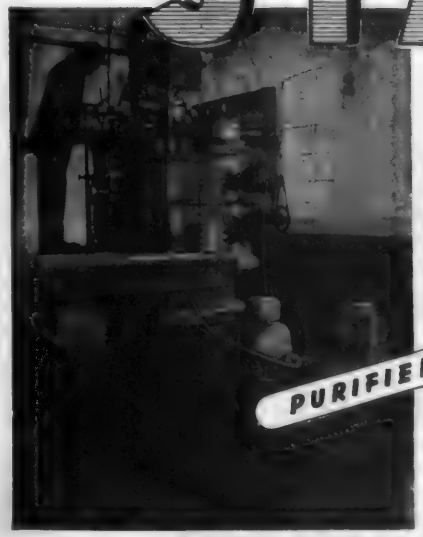

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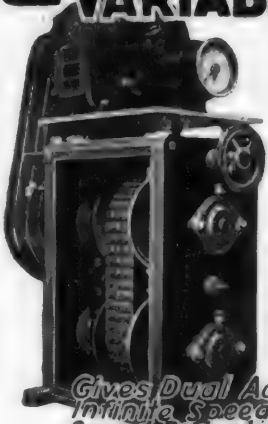

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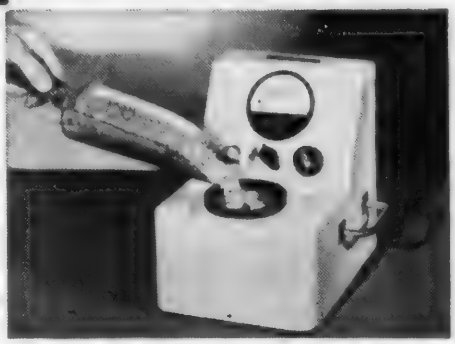

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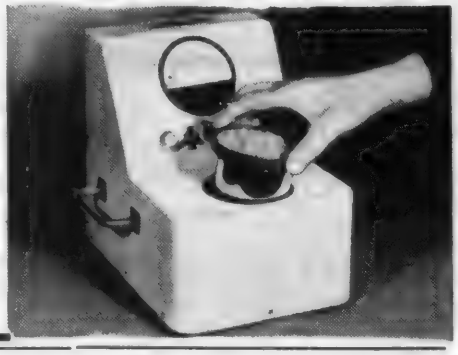

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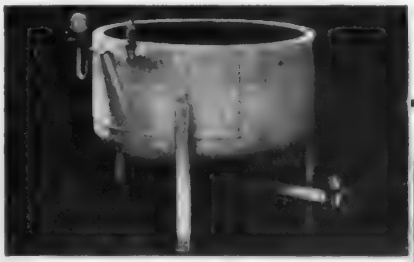

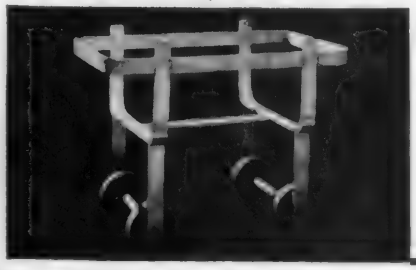

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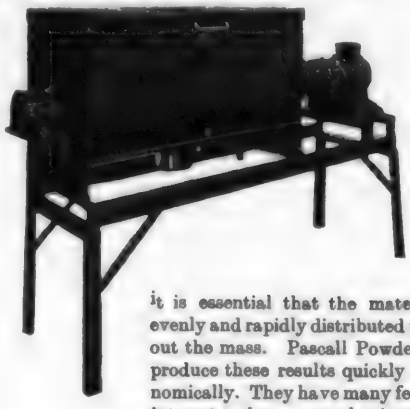

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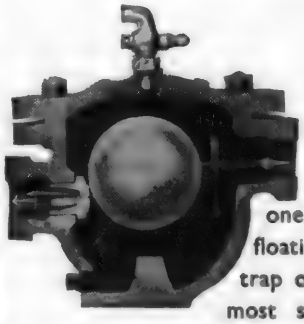

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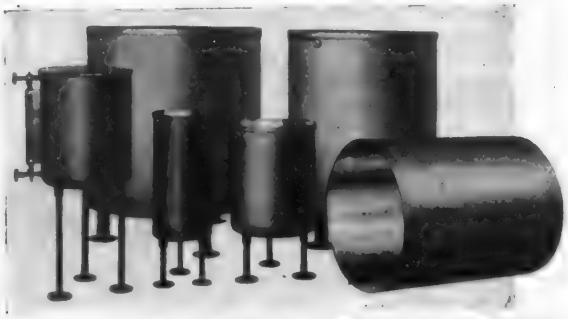

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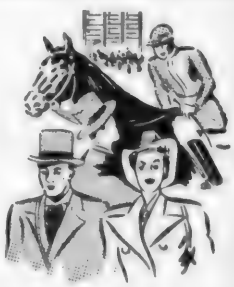

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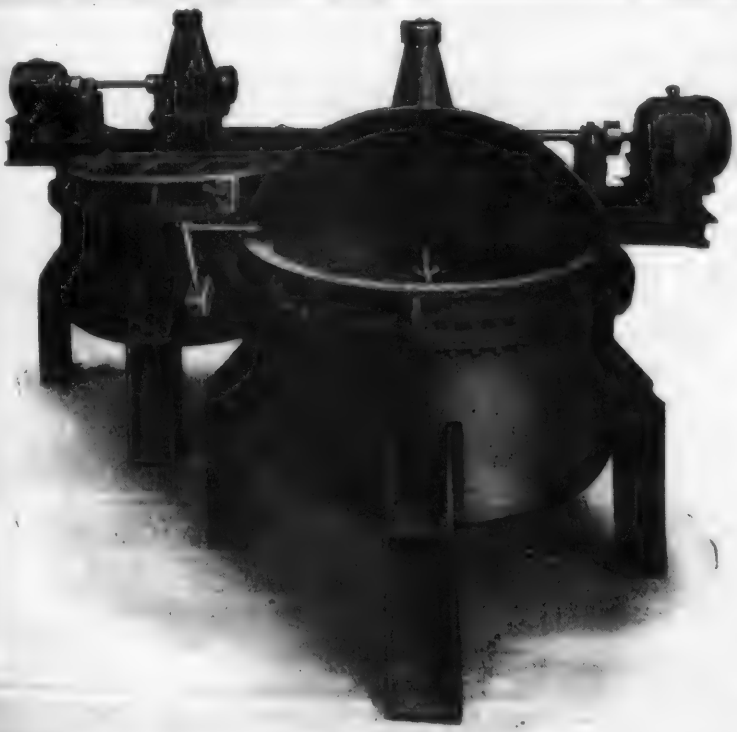

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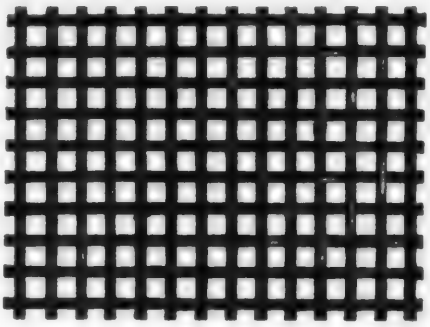

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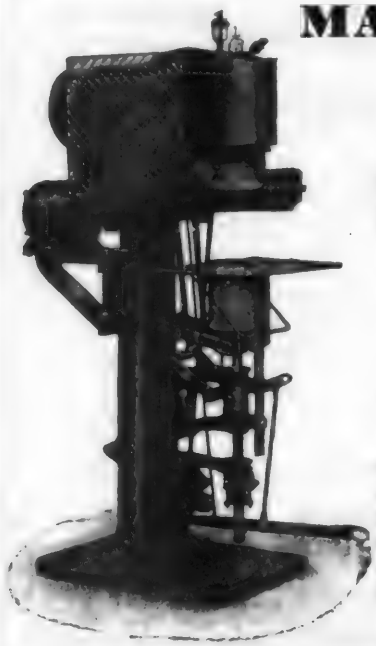

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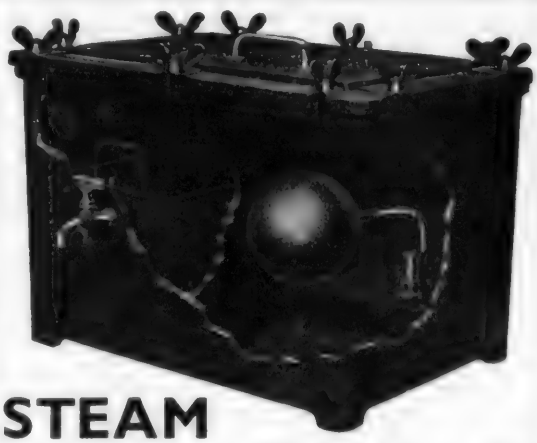

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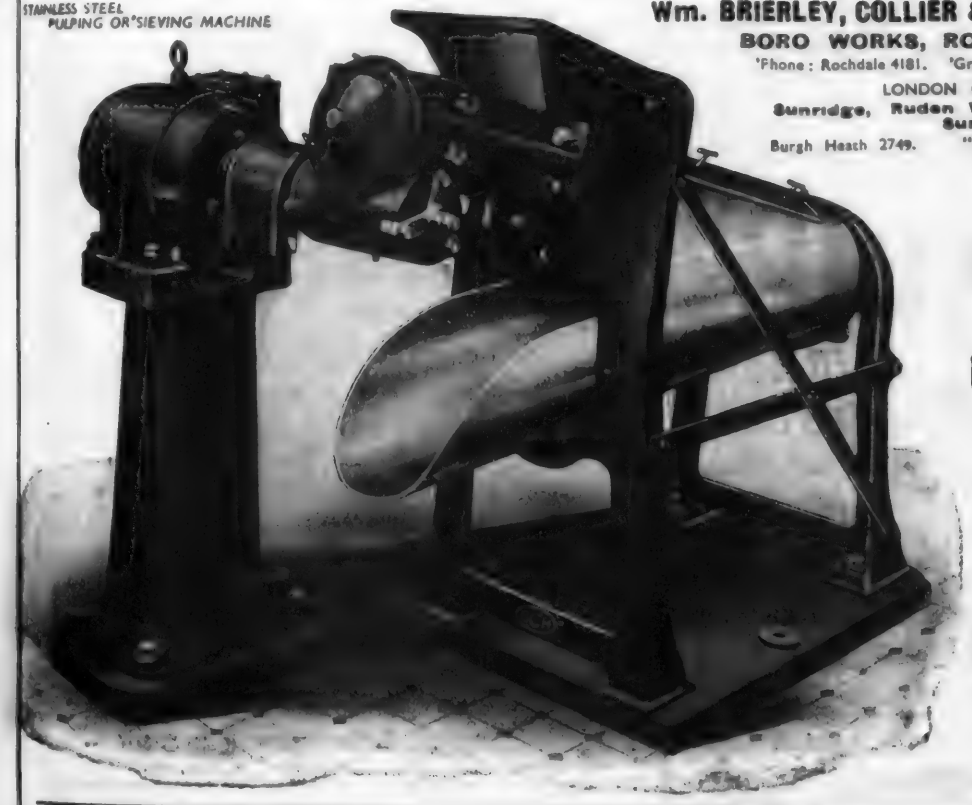

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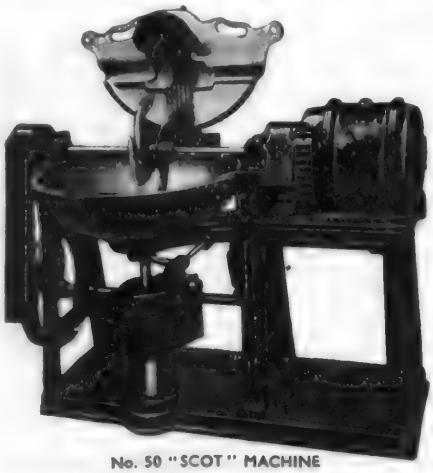

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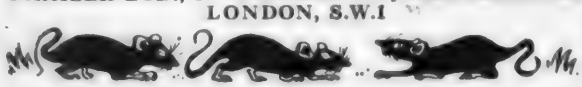

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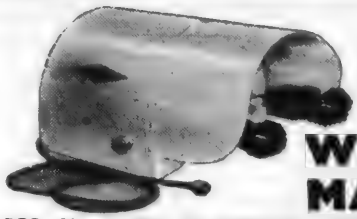

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CHIEF Engineer required for major food manufacturing concern. Qualifications essential energy and ability to organise staff more important than previous food trade experience.—Box B1436.

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FOOD Chemist with many years' practical experience in the manufacture of Bakers' Sundries and other food products, would join an established manufacturing company with view of developing new lines, or a wholesale house wishing to start manufacturing. Is willing to acquire some financial interest if desired.—Box B1442.

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COFFEE Roaster, gas-heated "A" Type "Whitmee," complete with cooling-bin, fan, electric motor and starter, output of 2-3 cwt. per hour. Coffee Grinding Mill, Pa Pulmac, fitted cheese crown and sieve, with angle iron frame, output 2 cwt. per hour. Wine and Fruit Press, French make. Hand-operated, screw type, tinned copper tray, wooden cage 2 ft. 3 ins. high by 3 ft. 2 ins. diameter, overall length 4 ft.—Offers to Lautier Fils Ltd., Power Road, Chiswick, London, W.4, where the above plant may be inspected.

FOR Sale: W. & P. Mixer, jacketed, tin-lined, 1 cwt., 2 speed, with tilting pan, mixing plates of gun-metal, complete with 2 h.p. single phase motor, as new; Fuller's Edgerunner Mill, size 10 ins. dia., 5 ins. high; Jackson & Crockatt Powder-filling Machine, completely overhauled with motor and starter, fixed on trolley; Extruding Machine, fully automatic, with cutting attachments for heavy pastes, for extruding 1 in. sticks; Liquid Mixer, 30 gall., jacketed, high-speed mixer; Cream Depositor, hand-operated, jacketed, electric heated, thermostat controlled; Vulcan Drying Oven, thermostat controlled, as new, size 30 ins. deep, 36 ins. by 34 ins. by 30 ins. *Newly Delivered in Stock:* Vacuum Liquid Filling Machines, complete with vacuum unit, suitable for filling all sizes of bottles; Cream and Paste Filling Machines, automatically operated, with complete set of filling attachments.—Box B1449.

TWO nearly new 30-gall. steam-jacketed Stainless Steel Tilting Pans, in first-class condition.—Write Box B1444.

5 Jacketed mild steel Worm Conveyors, 45 lbs. steam pressure, about 32 ft. long each, U-shaped, about 11 ins. by 11 ins., perfect condition. —Details Box B1451.

'Phone 98 Staines.

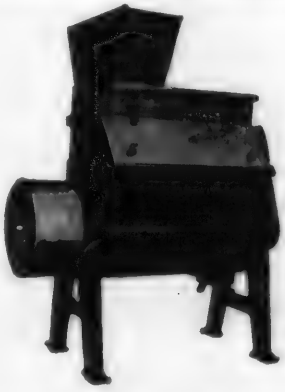
460 FT. Steel Slat Conveyor, 15 ins. wide; 2-in. all Gunmetal Centrifugal Pumps; 18 ft. Enclosed Chain Bucket Elevator; three jacketed Enamelled Cylinder, 18 ft. by 2 ft. dia.; Aluminium Mixing Pan, 400 gall., enclosed.—Harry H. Gardam & Co. Ltd., Staines.

FOR Sale: Twelve steam-jacketed metal coppers each with bottom centre run-off, hinged lid, complete with steam fittings, valves, etc. Capacity eighty gall. each. Boiler steam-pump available if required.—Apply Soup Kitchen for Jewish Poor, 17-19, Brune Street, Spitalfields, London, E.1.

TURNER Vertical Double Roll Rice or Cereal Mill, 25 ins. by 10 ins. rolls; Vertical Bucket Elevators and trunking; Koh-i-Noor Rice Purifier; Thornton Silk Reel Centrifugal Sifter; B.C.H. Self-Generating Copper Steam Tip Pan; 50-60 gall. Copper Tripod Steam Pans, bottom outlet; 30-gall. Steam Jacketed Iron Pans, top cover lid, front draw-off valve; Electric Dish Washers, Euk & Victor type; Hot Cupboards; Bread Slicers; Meat Cutter; Electric Potato Chipper; Fish Fryers; aluminium heavy-stock pans Electric Cake Mixers, 30/80 qt.; portable Ovens; Vertical Twin Cross Tube Steam Boiler, 6 ft. by 3 ft. for 80-lbs. steam; Marshmallow Whisking Machine; Caramel Cutters; Jap-Nougat Cutters; Brakes; Twist Wrappers; Plastic Caramel Cut and Wrap Machines; Carton Fold Wrappers; Portable Electric Liquid Pan Mixers, A.C. 400 volts; Drum Mixers; Gardner Sifter and Mixer, "E" size; Open Bowl Mixers.—E. W. Wallbridge, 136, Sefton Street, Southport. Tel. 5428.

SECOND-HAND PLANT FOR SALE

BAKER PERKINS 5 ft. by 4 ft. 6 ins. Chocolate Melangeurs, triple cocoa-grinding mill; Baker 3-roll Vertical Steel Refiner, 33 ins. by 13 ins.; "Fairport" 3-roll horizontal chilled steel refiner, 26 ins. by 12 ins.; Lehmann Open Fired Bean Roaster; Baker Perkins, Savey Jean and Lehmann Chocolate Enrobers, 16 in. bands; 50 ft. ammonia tunnel cooler; Baker Perkins Fan-ter-fil, Chocolate Tapping tables; Baker Perkins duplex horizontal mixer, 20 ins. by 19 ins. by 17 ins. detachable beaters, similar pattern stainless steel body, 29½ ins. by 29½ ins. by 24 ins. deep, two-speed; Holman heavy-duty, steam-jacketed base, 27 ins. by 29½ ins. by 22 ins. deep; 300-lb. Chocolate Kettle Baker Perkins; 2-cwt. B.C.H. Chocolate Kettle; Steam Treating Nut plant; B.C.H. Brazil Nut Splitter; B.C.H. Candy Peel Cutter; Hounsell Peel Cutters; Duckworth Dry Fruit Cleaner; Crosby Lozenge Cutter; Lozenge Paste Mixers; B.C.H. Crystallizing Plant; Dells' Starch-reclaiming Plant; "Gardner" Reel Sifter or Centrifugal; Doig Box Nailer; Paper Shearing Cutter.—E. W. Wallbridge, 136, Sefton Street, Southport. Tel. 5428.



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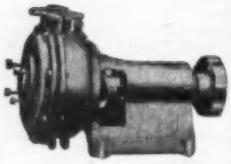

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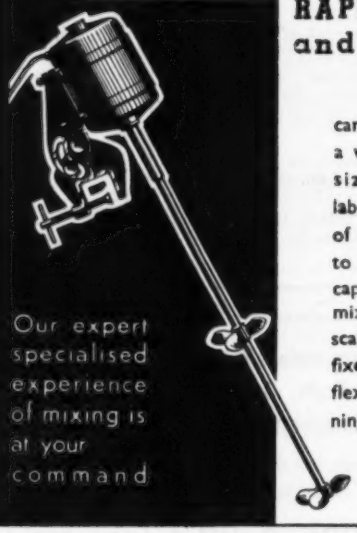

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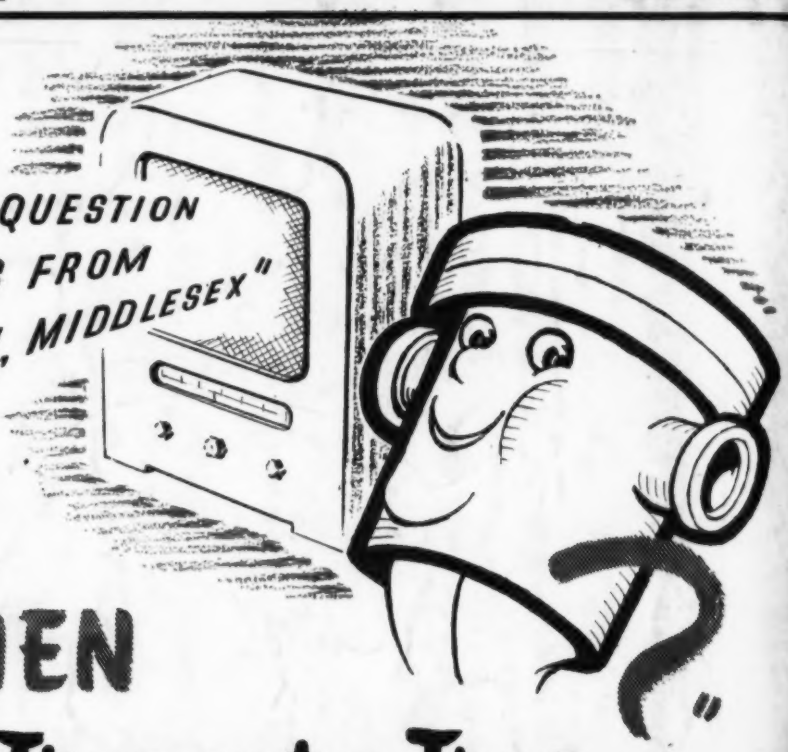

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